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ERRATA.—No. II.

Page 169, line 7, from bottom, *for* Bertin *read* Bayle.
—— 170, —— 1, *for* doses *read* death.
—— 174, —— 2, from bottom, *for* spontaneous case of aneurism, *read* case of spantaneous cure of aneurism.

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1 MARCH, 1832.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*On partial Fracture of the long Bones in Children.* By JOHN HART, M. R. I. A., Surgeon to the Dublin General Dispensary, Lecturer on Anatomy and Physiology at the Medical School, Park-street, &c.

THE bones differ very much in the relative proportions of the animal to the earthy part entering into their composition at different periods of life, a circumstance which materially affects both their liability to fracture and the length of time necessary for the accomplishment of reunion in individuals of different ages.

Thus, in infancy and childhood the animal part of the bones bears a greater proportion to the earthy, whence they possess a greater degree of flexibility. It is owing to this that fractures rarely happen in young children, notwithstanding the many falls to which they are subject, before

they have acquired the power of maintaining their equilibrium in their earlier essays in walking.

On the other hand, the bones of persons advanced in life, are harder and more brittle, in consequence of the accumulation of an increased proportion of the earthy part, to which is to be attributed the more frequent occurrence of fractures of the long bones, in elderly persons especially.

As the bones of children are less liable to fracture from the cause assigned above, so is the process of their reunion more speedily accomplished, inasmuch as their growth being still in progress, the blood-vessels engaged in the function of their nutrition are in a more vigorous state of action; while in the case of older persons, whose bones contain a less proportion of the animal part, and more of the earthy or saline constituents, reunion proceeds more slowly, because ossification being completed, the nutritious blood-vessels which were actively engaged in that process have fulfilled the task which was allotted to them, after which these vessels undergo a diminution in size, and a corresponding relaxation in their activity.

While the long bones of children are still soft and flexible, they are subject to a kind of injury, the occurrence of which is incompatible with the brittleness of the same organs in adults. This injury is a fracture which extends through a part of the diameter of the bone, the remaining part becoming bent in the manner in which a branch of a tree yields to an attempt to break it while it still retains its sap, thus—

It has fallen to my lot to meet with five cases of this injury within the last three years, one of which occurred in

the humerus, two in the radius, and two in the femur, and as this kind of fracture is not particularly described in any of our systematic works on Surgery, nor in any periodical publication to which I could obtain access, I shall briefly notice the particulars of one case, and conclude this Paper with one or two remarks on it.

Tuesday, February 10th, 1831, I was called to see Richard K., a child aged ten months, in consequence of an accident, of the nature of which his nurse affected ignorance. I found him labouring under the following symptoms: pain caused by handling the left thigh, which presented a marked deformity, having an angular projection forwards about its centre. On comparing this limb with the opposite one, it did not appear shortened, nor was there any turning out of the toes. A straight line from the great trochanter to the outer condyle, measured about a quarter of an inch less, while a line from the great trochanter obliquely across the front of the thigh to the internal condyle of the femur, gave a little better than a quarter of an inch more than similar measurements made on the opposite thigh.

I applied splints and bandages, which were removed on Saturday, the 21st, the eleventh day from the occurrence of the injury, when firm union had taken place. At this time the limb differed from the opposite one in no other respect than in having a slight prominence on the front of the femur, at the place where the fracture had occurred.

January 16th, 1832. I this day saw the child R. K., eleven months after the accident. There is no perceptible difference between the lower limbs of both sides, with the exception of a slight ridge which can still be felt on the front of the femur at the place of the former injury. He is beginning to walk, and makes equal use of both limbs.

The diagnostic symptoms of this affection are very simple, they are the following: pain and a bent state of the

bone injured without absolute shortening of the limb, on the contrary it is lengthened on the side to which the ends of the fractured part of the bone project. By attending to these circumstances it will be always easy to distinguish this injury from ordinary complete fracture.

Treatment.—The first indication in the treatment is to straighten the bent bone; to effect this, much care and delicacy of manipulation are required, for if it be rudely attempted with a force too great or too suddenly applied, the part of the bone which was merely bent may be broken, and the fracture rendered a complete one, the difficulty of treating which without deformity, will obviously be greater in a child, than in a person who can understand the necessity of submitting to restraint.

The next indication is to prevent the recurrence of the deformity, and to keep the fractured surfaces in contact until they become united by callus, and this is to be fulfilled by the judicious use of splints and bandages, as in ordinary fractures.

I need hardly remark on the shortness of the time (eleven days) in which reunion was completed in the above case: it illustrates the principle laid down in the commencement of this Paper which refers to the rapidity of the reunion of fractures in children, owing to the more active state of the vessels engaged in the business of ossification at that period of life.

Art. II.—*Effect of Prussic Acid upon the Tipula, or Crane-Fly, by means of which the curious Mechanism of its Ovipositor was observed.* By Maurice Scanlan, Esq.

The following may probably not be considered altogether unworthy a place in a Journal of Pharmacy, as a trifling contribution to one of its accessary sciences. As long as

the cancer, cantharis vesicatoria, coccus cacti, oniscus asellus, nutgalls, wax and honey, &c., are articles of our, or indeed any other Materia Medica, the well educated pharmacien should not be as ignorant of entomology as I regret this memoir will shew me to be.

The writer of "Insect Transformations," in the Library of Entertaining Knowledge, describes and figures the tipula in the act of oviposition, but states, that the ovipositor is thurst into the ground at the time; this must have prevented observers from seeing the manner in which the ova are jerked to such a distance. I am aware Kirby and Spence state that this insect when suddenly caught, jerks its eggs to the distance of ten inches, but they do not describe the mechanism by which this is effected.

In the month of October, two years ago, when the common tipula, or crane-fly,* is seen flying about in every direction, I caught one of these insects, and held it by the wings over the mouth of a large bottle of medicinal prussic acid which happened to be near me at the time;† the tipula, which before had struggled hard for its liberty, immediately on being presented to the prussic acid vapour, became motionless. I now laid it upon a piece of writing paper, in order to examine it with a magnifying glass. After the lapse of a few seconds I observed a convulsive motion, by means of which a single ovum was thrown from the abdomen into the ovipositor, which is a very curiously constructed apparatus, at the anal extremity. This convulsion of the abdomen, which somewhat resembled the operation of vomiting, appeared incapable of sending the ovum any further, leaving its total ejection to the ovipositor, which it affected in a most admirable manner.

The ovipositor of the tipula very closely resembles the

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* Father Longlegs, Harry Longlegs, &c.

† This acid had sp. gr. 998, containing 1.6 per cent. real acid.

beak of a bird, with both the upper and lower mandible divided longitudinally, each limb of each mandible being articulated and susceptible of motion laterally. The extreme end of the limbs of the inferior mandible, when placed together, form a tube. It was at the commencement of this tube the ovum was lodged. The limbs of the upper mandible now separated themselves, and bent downwards at a right angle with the lower one, which they closely embraced, and, with a sudden jerk, shot the ovum through the tube formed by the limbs of the lower mandible. About twenty ova were ejected in this way, and flung to a distance of about four or six inches from the insect. The tipula after some time recovered, and flew away. I repeated this experiment upon another female tipula with the same result.

At the time prussic acid began to be much used in medicine here, about fifteen years ago, I had one of those shrimp-shaped insects which we sometimes see in the water with which our city is supplied through pipes, in a glass of water. To try what effect it would have upon the insect, I put one or two drops of prussic acid into the water; the insect darted about with increased rapidity, and suddenly ejected two living insects. I do not recollect whether this insect survived, having completely forgotten the fact, till the tipula case brought it freshly to my recollection.

It may not be altogether out of place here, to recommend prussic acid to entomologists, for the purpose of killing insects, as being, when sufficiently strong, quick in its operation, and not likely to injure the specimen. I was one day a good deal annoyed, while weighing filters for an analysis, by a number of flies that had collected inside the lantern in which my balance was suspended, one of them occasionally alighting upon the arm of the balance, and causing, of course, that side to preponderate. In order to get rid of them, I placed a little prussic acid in a watch-glass, inside

the lantern, and shut it up; the flies, one by one, dropped dead, in less than a minute.

It may be questionable whether all insects would be readily destroyed in this way; however, I have killed large moths, by placing them under a funnel, and permitting prussic acid to trickle down its sides.

Art. III.—*On the Treatment of recent Catarrh.* By D. J. Corrigan, M. D., Physician to, and Lecturer on the Theory and Practice of Medicine at Jervis-street Hospital, &c.

As Catarrh has been of very frequent occurrence during the few last years, and threatens to retain its prevalence, a few observations tending to determine a disputed point in its treatment, may perhaps be not undeserving of attention. For recent Catarrh, the antiphlogistic treatment is that generally recommended by medical writers; while the popular mode of cure, which is often the result of experience on a large scale, consists of the exhibition of stimulants at the onset of the disease, and this treatment is sanctioned by Laennec, a high authority it will be allowed, on this subject.

Those who advocate the antiphlogistic treatment, and decry the cure by stimulants, say, that stimulants should never be employed, that there is danger of their superinducing pneumonia, by causing the inflammation to extend along the bronchial tubes, and to involve the texture of the lungs; it must however be admitted, and indeed the fact is familiar to almost every one, that by the exhibition of a heating stimulant at bed-time, a severe Catarrh has often been removed within the space of twelve hours. Whenever in practical medicine, we find opposite lines of treatment equally recommended for any one disease, we may gene-

rally conclude, that however similar cases may seem, the disease, about which there is a difference of opinion, possesses more than one species, which accurate examination might discover, and which would explain the conflicting advices on treatment. This has already been exemplified in the instance of croup, on the treatment of which there was for a long time a great difference of opinion, now easily reconciled and accounted for by the discovery that there are two species of that disease, closely resembling one another in all their prominent symptoms, but yet distinct in their natures. In like manner, there are, I believe, two species of Catarrh very similar in their general symptoms, but yet distinct in their pathology, and, as in the instance of croup, to be treated in different ways.

When Catarrh prevails as an epidemic, there is usually the closest similarity in the principal symptoms of nearly all the cases. The symptoms, it need scarcely be observed, are, suffusion of the eyes, discharge of acrid mucus from the nostrils, hoarseness, fits of coughing very frequent, and particularly troublesome on lying down at night, accompanied with scanty glairy expectoration, flying stitches through the sides, apparently seated in the attachments of the diaphragm, and produced by the violent efforts of coughing, and sensations of internal heat, soreness and oppression referred to the trachea, or sternal regions. The fact soon forced itself upon my observation, that the same line of treatment was not suitable for all cases, even though their leading symptoms presented a very great similarity. The antiphlogistic treatment which I at first adopted in accordance with the general advice given in books, produced very opposite results. In some cases the relief obtained was marked and immediate, while in other apparently precisely similar cases, there was an aggravation of the symptoms, or at best, no alleviation whatever ; and if diarrhœa, either natural or artificial, oc-

curred, the cough and catarrhal symptoms, instead of being relieved, were often aggravated during its presence. These opposite results clearly point out, that however similar the cases may seem, there is in their pathology some distinction. If a number of these similar cases be examined, they will agree, as already observed, in their general symptoms, they will present the same intensity of coryza, and of hoarseness, the same severe fits of coughing, and the same complaints of internal heat and soreness. Here, however, the similarity ceases. In some of the cases, on laying the stetheseope or the naked ear to the chest, there is heard a distinct wheezing, the "râle sibilant" of Laennec. In other cases there is no sound whatever of this kind, the respiration is heard perfectly natural and without any admixture of wheezing, even though the patient be suffering under severe fits of coughing, accompanied with the glairy acrid secretion of Catarrh. In all the cases, the hoarseness, cough, and internal soreness or heat, tell us that the mucous membrane of the larynx and trachea is affected. When with these symptoms there is wheezing heard within the chest, that wheezing clearly indicates to us, that not only is the larynx and trachea engaged, but that the inflammatory action has extended into the smaller tubes, that a large extent of mucous membrane is involved, that the affection has in fact become general bronchitis. On the other hand, when with the above symptoms, the respiration heard in the chest is natural, and free from all wheezing, it is then as clearly indicated, that the smaller tubes have not become engaged, that but a small extent of mucous surface is engaged, and that the symptoms, cough, hoarseness, &c. are owing to the affection of the larynx and trachea, which has spread no deeper. A very trifling degree of obstruction in the smaller bronchial tubes, either by thickening of their mucous membrane from inflammation, or by deposition of mucus, is sufficient to narrow their calibre so much, as to

cause wheezing, or "râle sibilant," by the passage of the air in respiration through the narrowed parts; but in the trachea, and the few short larger bronchi branching from it, the mucous membrane may be inflamed, or mucus may be deposited upon it without a sufficient narrowing being produced to give rise to any wheezing. Hence the presence in one case of the wheezing respiration, tells us that the smaller tubes are involved, that the affection is general bronchitis, while its absence in another case, assures us that the smaller tubes are not engaged, and we fairly infer that the affection is confined to the trachea.

When the inflammatory action does not extend to the bronchial tubes, but is confined to the trachea, as it very frequently is during the prevalence of an influenza, the exhibition of a stimulant will often remove the disease in twenty-four hours. Examples of Catarrh thus cured by a heating spirituous or aromatic drink at bed-time, have come under the observation of every one. When Catarrh prevails as an epidemic, the irritation and increased sensibility are usually first felt in the nostrils, and are then observed within the space of a few hours, or of a day, to be creeping downwards into the trachea. The affection of the larynx and trachea at this stage, seems to be one of little more than irritation, for the symptoms will suddenly attain a high degree of severity, and as rapidly subside; we know that mere irritation of the larynx will bring on fits of coughing, more violent than those produced by intense inflammation of its tissues. It is at this early stage of the disease, that a very marked alleviation of the symptoms, or even their complete removal, will follow the administration of a stimulant given at bed-time.

It seems to be a matter of little consequence, which of the diffusible stimuli is administered, but the preparations of ammonia are perhaps the best, and their efficacy is increased by combining them with the camphorated tincture

of opium, which, acting both as a stimulant and an anodyne, is probably better than the simple tincture. The dose of this preparation, to be of use, should however be larger than is generally given. Two or three drachms will form but an average dose for an adult. A stimulant thus administered at bed-time sometimes produces perspiration, but as often only an agreeable glow of heat over the entire surface. In the latter case the relief is as complete as in the former. The cough, which in recent Catarrh comes in fits, and is very frequent, although itself but an effect of the irritation of the larynx, becomes in turn a cause to keep up that irritation, and hence it is necessary to allay it. A cough mixture given for this object, should contain a large proportion of opium. Camphor mixture with a proportion of ʒi of the ordinary tr. opii, or a proportionate quantity of the camphorated tr. in ℥viii. will form perhaps one of the best anodyne cough mixtures we can prescribe. With many persons, however, the admixture of camphor, in any form, produces most disagreeable nausea. If the surface of the body be well protected, it is not at all requisite, with the treatment here recommended, to confine the patient within doors. We know that great changes in the temperature of air inspired, are borne with impunity as long as the cutaneous surface is protected from atmospheric vicissitudes.

The species of Catarrh confined to the trachea, or what may be called irritative Catarrh, disappears under this treatment, much more speedily than when an antiphlogistic or depressing treatment is employed, and relapses are less liable to occur. The patient's strength is also preserved, an object of considerable importance whenever affections of the mucous tissues form the type of prevailing disease.

If the Catarrh have lasted so long that it has become established in the bronchial tubes, which will be indicated by the wheezing heard within the chest, or if the attack from the commencement, be one of ordinary bronchitis,

having its seat essentially in the interior of the thorax, the treatment then to be followed is that ordinarily recommended for bronchitis, and on which we need not dwell here. In this latter case we could have no hope of arresting the disease by the exhibition of stimulants or anodynes; there is too large an extent of mucous surface engaged in inflammation, and the only effect of such treatment would be, to increase the intensity of the local inflammation, and to add to the general febrile excitement of the system.

It may perhaps be not amiss to glance at the objections raised to the treatment of all cases of recent Catarrh by stimulants and anodynes. That recent Catarrh is rapidly cured by these remedies, we have evidence before us almost every day; but such treatment it is notwithstanding said, is improper, lest it convert the comparatively trifling Catarrh into severe bronchitis. Against such a consequence we have, however, a sure protection in the diagnostic sign already pointed out. If the treatment recommended might have the effect (which I have never seen) of converting the irritative Catarrh into bronchitis, the wheezing respiration tells us of the approach of the more extended inflammation, we can change our measures in sufficiently early time, and our patient is then better able to bear depleting measures, than if the interval had been passed under an opposite line of treatment.

Another objection may be raised, that Catarrh is sometimes the result or the symptom of tubercles. When these exist, stimulants will increase the inflammatory action around them, and be thus productive of bad consequences. But no one with an ordinary share of tact and experience, will confound recent Catarrh, almost always commencing in the nostrils or larynx, and then perceptibly creeping downwards, with frequently recurring Catarrh, and quickened pulse, (without precursory laryngeal symptoms,) which are the forerunners of phthisis.

It might, perhaps, be dreaded, that the inflammation, though not spreading beyond the trachea, might there produce ulceration, as inflammation of the mucous membrane of the intestines very often ends in ulceration, or might cause deposition of lymph as in dysentery. Neither of these consequences need be dreaded. The mucous membrane of the air passages differs widely in its pathology from that of the intestines. In the latter, ulceration is a very common occurrence, but in the former so rare, that it is scarcely, perhaps never, seen unless in chronic cases, as in phthisis or in syphilis. Deposition of lymph, such as takes place in the intestines from the inflammation of dysentery, is, in the adult at least, an almost equally rare occurrence, so that we have not the same evil consequences to fear in the treatment of Catarrh, as in similar affections of the mucous tissue of the intestines. There are, however, two classes of patients with whom it is necessary to be cautious in the use of stimulants under all circumstances, children and pregnant women. In the former, there is some danger of Catarrh inducing croup, a disease for which stimulants would be highly injurious. There is also in children a much greater tendency than in adults, for inflammation of a mucous tissue to run rapidly over a great extent of surface, and Catarrh in them may thus quickly bring on congestion of the lungs. In the latter, almost all inflammatory affections, however slight, either require the lancet, or at least the state of the system is such, that it bears depletion with an impunity which the patient does not possess at other times.

In order to be able to make the diagnosis, which has been laid down as the guide of our practice in recent Catarrh, a very slight knowledge of the stethescope is sufficient. Whoever has once heard wheezing respiration within the chest will never mistake for it any other sound, and even those who have never had it pointed out, can

easily recognize it from description. It is the same sound as the wheezing which we often hear in the larynx of a child suffering under the irritation of teething, or as the precursor of croup, and which we can at any time imitate by rapidly sucking in air between the teeth and lips. The wheezing, whether in the larynx or in the bronchial tubes is the same sound, caused in both instances in the same manner, namely, by the whistling of air through a narrowed tube; the only difference between the two is this, that when produced in a narrowed larynx, we are able, from the proximity of the organ to the external air, to hear the sound at some distance, but when produced in the bronchial tubes, we are obliged, in order to detect it, to place the ear close to the parietes of the chest. In seeking for this sound in cases of recent Catarrh, we need never do more than place the stethescope under the clavicles. The bronchial tubes of the upper lobes of the lungs are those most frequently attacked by inflammation, and if there be no wheezing in them, we may be pretty certain that the bronchial tubes in other parts of the lungs are free from it.

To sum up, the conclusions to which I wish to draw attention are these: that there are two distinct species of Catarrh, the one an irritative Catarrh of the larynx and trachea, most generally commencing with the usual symptoms of influenza, not involving the bronchial tubes, rapidly cured by stimulants and opiates, and for which an antiphlogistic or depressing treatment is injurious, or at best inefficient; the other, the ordinary bronchitis of authors, having its seat in the minuter tubes, involving a great extent of mucous surface, and which is to be treated by the ordinary antiphlogistic remedies.

That the general symptoms of the two are very similar, and that the distinction between them is revealed by this, in the former, or irritative tracheal Catarrh, the respiration is natural over the chest, in the latter, or general bronchitis,

there is wheezing, the "râle sibilant" of Laennec, and generally heard loudest under the clavicles; and that the existence of these two species explain the difference of opinion which has existed on the treatment of Catarrh.

Should these few observations on a point of practical medicine be found suitable for a Journal to which I earnestly wish the best success, I shall again intrude upon its pages. Had I known at an earlier date of the forthcoming of an Irish Periodical, I might have had a better offering to present.

Art. IV.—*On the Composition of the Urine and Blood in Diabetes Mellitus.* By Robert J. Kane, M. R. I. A., Professor of Chemistry to Apothecaries' Hall.

There are few instances among the morbid states of the living system in which the application of chemistry to the medical sciences, is more direct, and its utility more obvious, than where, as in diabetes, the nature of a disease, and consequently its treatment, is to be determined by the composition of a pathologic product; a question evidently to be resolved by chemistry alone.

When we consider the present most generally received opinion as to the nature of this disease, we see that it is derived totally from the ideas of the composition of the urine and of the blood; a large quantity of a principle eminently vegetable, and containing no azote, makes its appearance in the urine, and its formation is accompanied by a corresponding diminution in quantity, of the most highly animalized principle (urea) with which we are acquainted. There takes place a de-animalization of the whole system: and in cases which terminate favourably, as the quantity of the morbid product (sugar) diminishes, the

urine is brought back to its natural condition by the reappearance of the proper quantity of urea, and thus these two principles, one of which contains half its weight of nitrogen whilst the other contains none, alternate in quantity, and, to use the words of Prout, the latest and best informed writer on the subject, their alternation constitutes one of the most remarkable facts in medicine with which we are acquainted.

During the spring and summer of 1831, while engaged in a series of analyses of diabetic urine, which formed a part of the duties of clinical clerk to the Meath Hospital, I accidentally observed some phenomena, which rendered it probable that the quantity of urea in diabetic urine, is not so small as is generally considered, and finally led me to the conclusion, that in this disease the urea is not at all diminished in quantity, but that a man secretes in a given time as much of that principle while dying of the most severe saccharine diabetes, as he does in a state of the most perfect health.

The circumstances which led me to the examination of the subject were as follow: it was customary, in order to determine the presence or absence of urea, to add to the urine concentrated to a sirupy consistence, some nitric acid: the solution became dark-coloured, and after some minutes some few crystals of the acid nitrate of urea of a brown colour were usually deposited. One day, after adding the acid, the solution remained clear and almost completely solidified from the deposition of white nitrate of urea; this effect, however, was only momentary, and after some minutes, the liquor became dark, a few bubbles of gas were disengaged, and the whole of the crystals disappeared. The solution then exactly resembled those which had always before resulted from the action of the nitric acid on the diabetic urine.

So remarkable a circumstance induced me to try whe-

ther a larger quantity of urea could be obtained than that usually gotten, and to endeavour to find out by what reaction of the acid on the principles existent in the urine, the deposition of the nitrate of urea under a crystalline form was prevented.

I evaporated equal volumes of healthy urine, Sp. Gr 1027.5, and of diabetic urine 1037, and added nitric acid to each; in the one a copious deposition of crystals took place, but in the other none. The colour of the healthy urine was however scarcely changed, whilst that of the diabetic urine originally paler, became dark reddish brown, and its temperature was sensibly augmented; there was effected therefore between the diabetic urine and the acid, some process of decomposition.

To avoid this, the experiment was varied thus:—the nitric acid was diluted with its own volume of water, and mixed with the diabetic urine in a phial, which was instantly immersed in a mixture of snow and salt; the process was successful, the colour of the mixture remained pale, and a copious crystallization of nitrate of urea crowned my most ardent hopes.

To ascertain whether the presence of the sugar was sufficiently powerful to prevent the formation of nitrate of urea, the following experiment was made.

To 1000 grains of healthy urine, Sp .Gr. 1027.5, 30 grains of sugar were added, and a similar quantity of the same urine taken pure. To each, after evaporation, was added the same quantity of nitric acid, the usual crystallization took place in the non-saccharine urine, but that which contained the sugar became dark-coloured, and but a very trivial quantity of nitrate of urea was obtained from it.

The nature of the products arising from the decomposition of the urea, was not particularly examined, as they did not appear of any pathologic interest. The solution contains much ammonia, and probably cyanic and oxalic

acids. Want of time precluded me from investigating the subject more minutely.

Called from the clerkship of the Meath Hospital, to the chair of Chemistry at Apothecaries'-hall, just at the moment when I had satisfied myself as to the fact, and obliged to commence immediately a course of lectures, I could not devote to the subsequent analyses, time sufficient for the estimation of the relative quantities of all the ingredients of the urine. As far as I could, however, I effected the insulation of the more important principles, the sugar, urea, and, where it existed, the albumen, and their quantities, taken from the whole solid matter, gives the quantities of the other animal substances, together with the salts. For the opportunities which were granted to me to make those researches, I take this occasion of returning my thanks to Drs. Graves and Stokes, the Physicians to that Hospital, who, real lovers of wisdom, take every opportunity of forwarding the progress of science in all its branches.

In the subsequent analyses, the method pursued was as follows:—a given quantity of the urine was desiccated cautiously as long as it lost weight, retaining the temperature constantly below 212°, the residue gave the relative proportions of water and of solid matter in the urine. To determine the quantity of sugar, an excess of solution of acetate of lead was added to the urine, and the precipitate separated by the filter. The lead in the filtered liquor was then thrown down by sulphuretted hydrogen, and the sulphuret of lead having been separated by the filter, the liquor was evaporated on a water bath to dryness, and the residue weighed; in some instances the confused crystalline mass was dissolved in spirit, and crystallized, but this part of the process was not found necessary.

The quantity of urea was determined by the process by means of which it had been first obtained in quantity; the mixture of acid and urine was immersed in a freezing

bath, and the nitrate of urea deposited, separated, dried, and weighed, and the quantity of urea calculated from its known composition. The nitrate thus obtained, is slightly tinged, but being weighed in this state, it gave a closer approximation to the truth than if it had been purified and decolorized; in which case, a portion of it would infallibly have been lost. The quantities of urea given, are those actually found, and I consider that they are less than actually existed in the urine, as I only succeeded in diminishing very much the action of the acid on that principle, without, however, by any means putting a total stop to its exertion.

I think it probable, that the uric acid not having been found in diabetic urine, depends merely upon the great state of dilution of that fluid, and on the small quantity in which that animal acid exists even in healthy urine. Some trials which I made in order to isolate it, were not successful; want of time prevented me from determining the relative proportions of the different salts, but they certainly exist in the natural proportions, as their total quantity is diminished merely in consequence of the dilution of the urine.

The following are the results of the analyses of diabetic urine, performed on those principles:

A man in the Meath Hospital, April 20th, 1831.

Urine, Sp. Gr., 1032.

Water, - - - -	929
Sugar, - - - -	47
Urea, - - - -	9
Salts, Uric Acid, &c.,	13
	1000

Mackay, a patient in Sir Patrick's Dunn's Hospital, clinique of Dr. Leahy, who kindly allowed me to examine the blood and urine:

Urine, Sp. Gr., 1030.25.

Water, - - - - -	942.75
Sugar, - - - - -	31.5
Urea, - - - - -	9.5
Salts, Uric Acid, &c.,	16.25
	1000.00

A man in the Meath Hospital, May 6th, 1831.

Urine, Sp. Gr., 1036.25.

Water, - - - - -	913
Sugar, - - - - -	60
Urea, - - - - -	6.5
Salts, &c., - -	20
	1000

A man in Sir Patrick Dunn's Hospital, clinique of Dr. Graves:

Urine, Sp. Gr., 1033.

Water, - - - - -	929
Sugar, - - - - -	51
Urea, - - - - -	5.3
Salts, &c., - - -	14.7
	1000

A man in the Meath Hospital, May 27th, 1831.

Urine, Sp. Gr., 1050.5.

Water, - - - - - -	880.5
Sugar, - - - - - -	70
Urea, - - - - - -	13.5
Albumen, - - - - -	3
Salts, &c., and loss, -	33
	1000 *

From these results, it is evident that the idea of this disease, consisting in a conversion of urea into sugar, is untenable, and that the secretion of that vegetable principle goes on without influencing in any degree the secretion of the other constituents of the urine, at the same time, the quantity of fluid taken in, increases very much the volume of the urine passed, and of course, reduces considerably the quantities of the normal constituents of the urine in any given weight of that secretion. This circumstance, coupled with the difficulty of protecting those easily alterable principles from the action of the bodies we use in such analyses, has been the cause of diabetes being considered to have as its pathognomic character, a diminution in quantity of urea, and an excessive secretion of sugar; those two principles alternating in their quantities, and albumen appearing in the urine as an intermediate step in the chain of organization, when the sugar was changing back to urea, on the recovery of the patient, or when the urea was degenerating into sugar, if the disease was on the increase; while, in fact, allowing for the dilution, the urea, salts, and probably uric acid, exist in the healthy proportions, and the secretion of the sugar is a lesion of that function, perfectly primary and independant.

* This man made but ten pints of urine in the day, at the time of the analysis, which accounts for the great degree of concentration of the urine.

Having, in three of the cases which afforded me the opportunity of studying the composition of the urine, obtained a sufficient quantity of blood to enable me to perform a pretty accurate quantitative analysis of that fluid, I endeavoured to satisfy myself as to that subject which has given rise to such contrariety of opinion among chemists, viz. the presence or absence of sugar in the blood of persons affected with this disease.

Being unable to devote but a comparatively small portion of my time to these researches, I was obliged to omit the quantitative estimation of the various saline matters; this, however, I consider but of little importance, as it is very improbable that these substances play a very important part in the phenomena of diabetes.

The analyses were conducted so as to determine two points, 1st, the existence or not of sugar in the blood; and 2nd, the relative quantities of water, oxide of iron, and the organized principles, as albumen, fibrine, hematosine, and the phosphuretted fats (cerebrine of Vauquelin).

In order to find the sugar, if any had existed in the blood, the serum was carefully evaporated to dryness, and the residue digested at a temperature = 100° F. in alcohol, sp. gr. ,830 for an hour. The alcoholic solution, which was of a very pale yellow colour, was then distilled to one-half, when a few flocculi of the white phosphuretted fat of Denis were deposited, which were removed by filtration. The clear liquor was then evaporated gradually, and frequently allowed to cool and deposit crystals, until the whole was evaporated to dryness. During these repeated evaporations and refrigerations, successive drops of saline matters, principally common salt, were obtained, deeply coloured yellow by osmazome, and mixed with a trace of fatty matter; no sugar could be by any means discovered; the saline crystals, however, were coloured yellow by the animal matter, from which it required a second crystallization to free them, and owing

to which they yielded by the action of nitric acid traces of oxalic acid; their taste, however, and their purification by re-crystallization would totally prevent any person from mistaking them for sugar. To estimate the utility of this process, five grains of sugar dissolved in a little water were mixed with a pound of blood, previous to coagulation, and were afterwards readily discovered in the serum by following it.

To fulfil the second object of the analysis, viz. the quantitative estimation of the different organized principles, the mode of analysis adopted by Denis, was followed, which renders it unnecessary to go at length into the details of so complicated a process. The quantity of blood operated on was in no case less than eight ounces, three quantitative analyses were made, the results of two of which are here given. In the report of the third in the laboratory book, the quantity of fibrine is not mentioned, which prevents me from inserting it here, although the quantities of all the other principles coincided with those in the other analyses, and I perfectly recollect that the fibrine in this case did not deviate from its usual range.

A man in the Meath Hospital, clinique of Dr. Graves.

Sp. Gr. of Serum 1030.

The blood was composed of

Water - - - -	798.13
Fibrine - - - -	2.18
Hematosine - -	114.50
Per-oxide of iron -	.45
Albumen - - -	50.13
Phosphuretted fat	1.70
Osmazome, Salts and loss - - - -	33.21
	1000.

Mackey, Sir Patrick Dunn's Hospital.

Specific Gravity of Serum 1029.75

Water - - - -	781.0
Fibrine - - - -	2.9
Hematosine - -	130.4
Per-oxide of iron -	.56
Albumen - - -	45.5
Phosphuretted fat	2.0
Osmazome, Salts and loss - - - -	37.64
	1000.00

The results of these analyses shew that in Diabetes, the relative proportions of the organic principles remain quite within the limits of the composition of the blood in perfect health. In fact, the blood cannot, as far as these experiments go, be considered as at all affected in this distressing malady. With regard to the non-existence of sugar, it is in opposition to a physiological principle, to the general truth of which I myself fully subscribe, that secretion is merely a kind of elective transudation, and that the substances secreted, all existed previously formed, and ready for separation, in the blood; our negative results should therefore stimulate us to seek after more perfect instruments of research, and more accurate methods of analysis, for we are as yet merely at the entrance of the applications of chemistry to medicine, and have before us a field capable, I doubt not, of immensly valuable practical application, if we can only improve our instruments and processes so as to insure its proper cultivation.

ART. V.—*Cases of Aneurism.* By W. H. PORTER, Esq., one of the Surgeons to the Meath Hospital, Lecturer on Surgery at the Medical School, Park-street, &c.

CASE 1.—*Aneurism of the subclavian artery, above the clavicle; attempt to secure the innominata, unsuccessful, by reason of the diseased condition of that vessel.*

December 6th, 1831. Matthew Collins, æt. 47, admitted into the Meath Hospital, under the following circumstances.

He has a large pulsating tumour on the right side of the neck, of an oval form, its anterior edge resting on the trachea, its posterior extending beyond the edge of the trapezius muscle; it passes upwards more than half way on the neck, and its inferior margin rests upon the clavicle, which bone it seems to have slightly depressed. Above the sternum and the sternal extremity of the clavicle, there is a space of about a finger's breath unoccupied by the tumour. The transverse measurement of the tumour is $5\frac{5}{8}$ inches, in the perpendicular direction it is 3 inches. It is hard, firm, and is not diminished by pressure to any extent worth remarking. The external jugular vein is seen to cross it obliquely, in a swollen and varicose condition, indicating the existence of some obstruction to the circulation in the subclavian vein. The bruit de soufflet is only heard distinctly towards the external edge of the tumour. The patient complains of great pain in the tumour, but it has not advanced forwards sufficiently to interfere with either respiration or deglutition.

He complains of numbness and pain in the fore-arm and hand, chiefly towards the ulnar edge of the arm, and in the middle, ring, and little fingers. All the fingers are aduncated, and the hand is blue and colder than the other.

All the functions seem to be performed regularly and well, except the circulation, and that is deranged only to an extent, that can be explained by the mechanical pressure of the tumour on the subclavian and carotid arteries, and on the subclavian vein. There is no pulse at the wrist, nor can the artery be felt at the bend of the right arm—the temporal artery at that side is felt rather to thrill than to pulsate—the interruption of the venous circulation is proved by the livid colour of the arm, and forearm, and by the appearance of the external jugular vein already noticed. But the heart beats regularly and equably, and the pulse in the other arm is that of a healthy man. Respiration appears to be free and undisturbed. The tongue is clean—the appetite good, and digestion well performed. He would sleep soundly, but for the pain of the tumour.

The history of the case is shortly this—he had been a labourer, but not employed in any work of particular hardship, nor is he sensible of having ever received the smallest injury. About two years and a half ago, he perceived a small kernel-like tumour above the middle of the right clavicle, which was not painful, and increased but very slowly. It gave no uneasiness at first, and the patient states that it was only within the last twelve months that he experienced numbness or pain in the arm; he also states that its growth has been in general rather slow.

Treatment.—He was ordered to bed, to be kept perfectly quiet, placed on low diet, and to take some mild saline aperient medicine.

December 7th. He complained very much of pain in the arm, and of a total loss of sleep in consequence, and requested eagerly that something might be devised for his relief.

The tumour was again examined very minutely, with a view to ascertain whether there was a possibility of

securing any artery at its cardiac* side, and it was found that the pulsation could be distinctly felt nearly as far forward as the anterior edge of the mastoid muscle, and so low in the neck as to come within a finger's breadth of the sternum. It was therefore determined, that independent of the difficulty and danger of tying the subclavian artery, before it has reached the scalenus muscle, in ordinary cases, in this one it appeared to be impossible, and therefore, if any operation was to be undertaken, it should be that of placing a ligature on the innominata. This was accordingly attempted on the morning of Saturday, December 10th, in the presence of the largest assemblage of Surgeons, perhaps, ever witnessed in Dublin.

The operation.—The patient having been placed on a table, his neck supported by pillows, so as to allow his head to hang over them, an incision of about two inches in length was made, commencing at the left sterno-clavicular articulation, and carried transversely to terminate above the edge of the clavicle on the right side. From the left extremity of this incision, a small perpendicular one was made, and the little flap dissected upwards. This incision brought into view the fascia of the neck, which was then divided. The sternal attachment of the right mastoid muscle was then divided on a director passed beneath it. The deep fascia of the neck now exposed, appeared to be of great strength and firmness; it was torn through with a forceps, and then divided on a director to the extent of the first incision. A very small artery was wounded, and immediately secured by ligature. The carotid

* It was mentioned by Mr. Porter in a clinical lecture delivered on this case, that in consultation, it had been suggested to him, to tie the artery at the distal side of the tumour, but he had declined it, principally on the following grounds: 1st, that the success of this operation in subclavian aneurism had not in his mind been sufficiently established; and 2d, that whatever could be accomplished by it, had in all probability been done by the pressure of the tumour, no arterial pulsation being traceable beyond the aneurism.—Ed.

artery could now be felt pulsating strongly under the sterno-hyoidei and sterno-thyroidei muscles. After some delay, the external edge of the right sterno-hyoideus was raised up, and a director being passed beneath, the sterno-hyoidei and thyroidei, on both sides of the neck, were completely divided. The sheath of the vessels was now opened, and the right carotid exposed, which seemed to have been pushed forward on the trachea, by the pressure of the tumour,—the nervus vagus was seen in its usual relative position, lying in front of the subclavian, and the superior angle of the bifurcation of the carotid and subclavian was distinctly observable. The knife was now laid aside, and an attempt made to separate with the finger the attachments of the innominata, in order to pass the needle round it. On the left of this vessel, the insulation could be easily effected, and had it been necessary, the finger could have been passed down to the aorta. In front, it was more difficult, principally by reason of the operator's finger being compressed between the trachea and sternum. The patient was exceedingly unsteady, and could not be prevailed on to be silent for one moment, whilst at every cry that he uttered, the trachea was forcibly pressed against the posterior surface of the sternum. As the operation was proceeded with towards the right of the vessel, the difficulties increased. No limit could be found to the artery; it appeared like an immense pulsating aneurismal sac, rough, and uneven to the touch, and communicating a sensation to the finger, every way unlike that imparted by feeling the vessel at its left side. *Compression on the innominata was now tried, and it stopped the pulsation in the tumour,* shewing that the aneurism was one of the subclavian artery, but what the nature of this enormous tumour might be, passing deeply below the clavicle, and behind the ribs, closely connected with the innominata and the portion of the subclavian within the scalenus, did not so clearly appear. It might have been a dilatation of these

vessels, caused by the pressure of the tumour, but the circumstance of being enabled to control its pulsation made against that idea, for compression could not be applied to even a quarter of the vessel so dilated. It might be that an aneurism of the aorta existed, distinct and separate from that of the subclavian, and pushed itself upwards in close and immediate connexion with the innominata, but the extraordinary regularity of the circulation every where but in parts influenced by the subclavian tumour, would scarcely warrant a belief that the arterial system was so extensively engaged. Again, it seemed possible that the aneurism of the subclavian might have taken this extraordinary direction into the chest, and under that idea considerable exertion was made to get beyond it, and reach a healthy part of the artery, nearer to the aorta, in order to throw a ligature round it, but it was impossible; and after the most painful exertions during an hour and a quarter, the operation was of necessity abandoned, the wound dressed with a couple of sutures and adhesive plaster, and he was placed in bed, where he was immediately attacked with a rigor which lasted two hours, and was probably occasioned by his long exposure during the operation. Five hours after the operation he had some very tranquil sleep, but in the evening his pulse rose, his face became flushed, and he was in consequence bled to the amount of 22 ounces.

December 11, eleven o'clock, A. M. Patient lies on his back, apparently free from uneasiness: says he feels no pain of any description, but that the wound is a little sore. He is unwilling to be stirred. He has passed a good night, and says the pain and numbness of the arm are no longer felt. The strength of pulsation in the aneurismal tumour *appears* to have diminished.

Ordered.—Ten drops of tinct. digitalis in an oz. of cinnam. water, three times a day.

To observe the most perfect quietude, ice to be applied to the wound and to the tumour.

December 12. Has slept but little last night, more from general restlessness than from pain—has a short distressing cough, brought on by speaking or changing his position—some slight inflammation with a reddish serous discharge from the wound. His bowels have not been opened since the morning of the 10th, and he refuses to take any medicine for the purpose, as he dreads the disturbance it would occasion. Pulse 75—skin cool—tongue moist—some thirst. Treatment.—The digitalis and the cold local applications to be continued.

December 13. The wound dressed for the first time, and the stitches removed, the discharge of the same nature and small in quantity. The cough relieved. Pulse 72.

December 14. All appearances of inflammation around the wound have disappeared: the discharge small in quantity, and healthy. Pulse 70, tongue foul, but his bowels have not been freed since the morning of the operation. The pulsation in the tumour is not so distinct as it was before the operation. He has consented to take some aperient medicine which was directed, and spirit and water dressing to the wound.

December 15. Bowels not yet opened, and he has passed an uneasy night. There is a sensation of cold in the right arm, although, when the limb is examined, it feels hot and dry. Pulse 70, respiration natural, cough better, the wound healing rapidly, pulsation in the tumour as before.

℞ Calomel grana iv.
Pulv. Rhæi grana vi.
Fiat Bolus, statim sumendus.

December 16. Has had four discharges from his bowels yesterday, after which he slept well, and experiences no uneasy sensation to-day.

December 20. Since the last report nothing has occurred worth remarking. Patient says that the right arm causes him but little pain, and is by no means so numb as before his admission into Hospital. The functions of

circulation, respiration, and digestion, regularly performed. Sleep natural and refreshing. The wound healing fast, he only complains of a sensation of stiffness and itchiness in it.

December 26. Wound nearly healed, and the discharge trifling. Its situation appears to have shifted to more than half an inch higher than the place of its infliction, and it is now considerably above the sternum. Whether this apparent change of place is occasioned by an actual diminution of size in the tumour, is not easily determined, but it is not easy to explain it on any other supposition, for the manner in which the wound has been dressed with compresses, &c. should rather have given it a contrary direction. The tumour is undoubtedly harder and firmer than it was, and amongst those who have an opportunity of seeing it, there is some difference of opinion as to whether it is not actually smaller.

January 5, 1832. The patient is up, walking about the ward, and apparently as well as before the operation, the wound being so far healed as not to require further dressing. There can, however, be no doubt that the aneurismal tumour is still receiving fluid blood, for since he arose from bed, and discontinued the use of the digitalis, the pulsation has become just as plain and as forcible as it was before the operation, although he fancies himself much better, and says his arm is almost free from the inconveniences of which he before complained.

February 9. The features of this very curious case have still undergone another change. The tumour has gradually diminished, and is now not one quarter the size it was on his admission, and the pulsation is scarcely perceptible. He is recovering both feeling and power in the arm. His health is excellent, and altogether he seems as well as if he had never been the subject of so painful and perilous an operation.

Case 2.—*Axillary Aneurism in a patient advanced in life, ligature of the subclavian artery external to the scalenus muscle.*

December 27, 1831. Edward Hopkins, stating his age at one time to be sixty-three, and at another sixty-seven, with eyes bleared and sunken, appearance pale, and evidently labouring under great debility, was admitted into the Meath Hospital.

About five weeks previously, he had observed that his left arm and hand were weak and painful, with a prickling sensation of numbness in the fingers. He was obliged to give up his employment, and soon the arm became so weak that he could not put on his clothes without assistance. He also states, that about eight or nine days before his application at the hospital, he remarked a small throbbing tumour at the upper part of the left breast, under the collar bone, but it is questionable whether he had really observed it, as on his admission he never spoke of its existence, and complained only of rheumatism in the arm. He denied having received any injury, or made any unusual exertion previous to its appearance.

On examination, a pulsating tumour was seen under the left pectoral muscle, reaching upwards to the clavicle, which was elevated by it; its edges (in consequence of its depth) not being clearly defined. It was not painful: was capable of being diminished in size by pressure on it, and compression of the artery above the clavicle stopped its pulsation altogether. The fingers of the left hand were aduncated, and he complained of great pain in that arm, below the insertion of the deltoid muscle. The patient's general appearance is sickly and indicative of weakness. His pulse, however, was tolerably firm, beating 72 in the minute, and equally regular at both wrists. His appetite good: respiration and the other functions as healthily per-

formed as could have been expected in a man of his very advanced age.

This was a case surrounded with difficulties. Had the patient been some twenty years younger, there could have been no question as to taking up and tying the subclavian artery at once, but here was a man in all probability sixty-seven years of age, and what more likely to happen, than that he would sink under so severe an operation, and it might be, die in a few hours afterwards. But beside that risk, every surgeon knows, that at this time of life the arteries are very subject to become affected with earthy depositions between their coats, and the spontaneous occurrence of the aneurism would warrant an apprehension, that some diseased condition obtained here. Twice, on the face of a stump, had I seen diseased arteries crack under the ligature, and the hæmorrhage only restrained by passing a needle deeply and including a portion of the adjacent structures, along with the vessel within the cord, and as no such resource was here available, a similar yielding of the artery must have occasioned instant death. But even on the supposition, that the artery would not thus break down, it seemed scarcely probable that with this diseased condition of its coats, it would run healthily through the process of adhesive inflammation, and then secondary hæmorrhage should be the result. Indeed, even allowing that the arterial structures had not thus degenerated, the age of the patient seemed to be against the probability of healthy actions being established in his system, and therefore the risk of secondary bleeding was fearfully enhanced. Besides, the consciousness that hæmorrhage, if it did occur, could not be arrested: that the vessel could not be secured nearer to the heart: that compression could not be applied in so deep a cavity: in short, that those resources, which, although usually inefficacious, still afford a hope, were, in this instance, wholly out of the question, added greatly to the

embarrassment of the case, and to the difficulty of determining whether an operation should be undertaken for its relief or not.

However, the aneurism continued to increase rapidly; it had nearly doubled its size in less than three days, and it became evident, that if any thing was to be done, it should be done quickly. Besides that of my colleagues in the Meath Hospital, I had the advantage of the advice of several surgeons connected with other institutions, and it seemed to be the unanimous opinion, that the patient was entitled to whatever chance of life the art of surgery could offer. The only point now to be determined was, as to the nature of the operation to be attempted.

One suggestion was, to tie the artery at the distal side of the tumour. I rejected it at once. I have no faith in it in cases of subclavian aneurism.

Again, it was mentioned, that the artery might be exposed and compression applied, sufficient to arrest the current of blood through it without dividing its coats. I doubted the possibility of applying such pressure here, or of the patient enduring it a sufficient length of time to allow of the coagulation of the blood within the sac. Besides, some of the most terrific cases of secondary hæmorrhage I had ever seen had followed on the use of a presse-artere.

It was also suggested that the vessel might be exposed, and if its coats were found to be diseased, the wound might be closed and healed without interfering with the artery. The result of the former case seemed to shew, that even a severer wound might not be attended with very great danger. But independent of the difficulty of examining so small a portion of a vessel as must have been necessarily exposed, and that too, obscured by blood, and lying in a deep cavity, there was every danger that an increasing aneurism would extend itself in that direction where there

was least resistance, that is, where the fascia should be divided in the operation, and would probably burst into the wound in the course of a day or two. It was therefore determined, that the artery should be included in a single round ligature, and the operation was performed on the 31st December, 1831.

The patient being laid on the table in such a position, as to allow the light to fall strongly on the situation of the vessel; his neck extended as far as he could bear, and his arm applied closely to his side; an incision of about $2\frac{1}{2}$ inches in length was made, immediately along the superior edge of the clavicle, and terminating internally at a point corresponding with the middle of the scalenus muscle. From the internal extremities of this, a small incision was carried upwards, and the little flap dissected and thrown up. The superficial fascia of the neck was thus exposed, and a vein of about the diameter of a crow-quill was seen running along, close to the edge of the clavicle. This fascia was then divided in a transverse direction above the vein, to the entire extent of the first incision, and a quantity of loose fat and cellular tissue exposed, which was torn through, and pushed towards the external angle of the wound with the handle of the knife, and the nail of the fore finger. At a considerable depth in the neck, a very strong fascia came into view, beneath which lay a vast number of very minute veins, giving to the membrane a purple colour, and as this fascia rose in the wound and receded again, according to the alternations of inspiration and expiration, it seemed exactly as if the pleura occupied some extraordinary situation in the neck, and was here endangered. This fascia having been cut through, and divided on a director to the entire extent of the wound, a quantity of thick granular fat, and small indurated glands was exposed, which embarrassed the operation so much, that some of these glands were of necessity removed. The wound had now been

carried so deeply, that in order to explore its bottom, it was requisite to have its edges drawn asunder by small silver spatulas, bent at the extremity. The edge of the knife was scarcely used at all, and the operation prosecuted with its handle, and the nail of the fore finger.

At a depth of nearly two inches, the edge of the scalenus came into view, with two large trunks of nerves proceeding from its external margin. To both of these nerves the artery communicated its pulsations, and to the inferior one in so remarkable a manner, that there was no mode of ascertaining whether it was really the vessel or not, except by passing the needle beneath it, making pressure on it, and seeing if such pressure commanded the pulsation in the aneurism. This was tried, and it became evident that the artery was to be sought for at a greater depth. The edge of the scalenus formed an unerring guide, and by following it, and still using the nail of the fore finger, the artery in a very short time was sufficiently exposed to allow of the needle* being introduced beneath it, in a direction from below upwards. Pressure now commanded the aneurism, and the finger was held for a minute on the vessel, in order to ascertain, if possible, the presence of any earthy deposit in its coats, but no such condition could be discovered. The ligature having been passed, some difficulty occurred in tying it, by reason of the depth of the wound, but it was accomplished, and one end of it being cut close to the knot, the other was left hanging from the wound, which was closed with three stitches, supported by a few straps of adhesive plaster. The patient bore this operation, which lasted twenty-five minutes, with great firmness, but towards its termination became very pale,

* The needle used on this occasion, was the same as that used by Mr. Porter in his former operation of tying the subclavian artery; a description of it, with a plate, will be found in the Dublin Hospital Reports, Vol. V.

and was carried to his bed much exhausted. He was ordered a draught, containing 16 drops of the acet. tinct. of opium, in some cinnamon water.

Towards evening, he lost this pallid look, and as night approached, his countenance appeared red and flushed—his pulse rose to 120, hard and vibrating under the finger—his skin hot and dry—he had great restlessness, and began to use some incoherent expressions. Fifteen ounces of blood were taken from the arm, and whilst it flowed his pulse again became soft and compressible. In two hours afterwards he fell into a sound sleep, which lasted (with one short interruption) until twelve o'clock next day. During the period alluded to, he started from his bed—his eye wild and wandering—his stomach inclined to nauseate, and his extremities cold. With some difficulty he was persuaded to return to bed, and jars of warm water having been applied to his feet, their temperature was restored, and he soon became composed.

January 1, 1832. Greatly relieved by his sleep; bowels not freed, although he had been ordered an opening mixture last night.

January 2. Slept a good deal during the night, and had some warm perspiration. Temperature of the left arm higher than that of the other. Pulse 92. Tongue loaded, hard and dry. Bowels still constipated. He was ordered 5 grs. of calomel in a pill, and a draught of castor oil, to be taken in three hours afterwards.

January 3. The medicine had no effect, and the tongue (to day) was dirty, with a red, hard, and dry patch on its centre and tip. Temperature of the body natural, but its surface had not that soft, moist feel, observable in perfect health. Pulse 90. He complained only of weakness and oppression about the heart, and seemed desirous of food. He was ordered a turpentine enema.

January 4. Bowels were opened very largely by the

injection, and the tongue was not so loaded or so hard as before, but he complained still of the oppression about his heart, and there was such prostration of strength, that he seemed to be sinking rapidly. He had raved during the night, but as it had been learned that he was accustomed to do so, even in health, less attention was paid to that symptom.

He was ordered 2 oz. of red wine during the day, and to have some jelly.

℞ Carbonatis ammoniæ scrupulum
Succi limon. q. s. ad saturationem
Aquæ q. s. ut fiat mistura.
℥ sumat unciam omni horâ.

January 5. Had a very restless night, with raving and tossing about the bed, and although he said he was better, yet his appearance was most discouraging—pale and wan, his eyes glassy, his lips dry, and his tongue hard and almost black, sleeping badly, and raving throughout the night, it seemed almost impossible that he could struggle through. A small slough of cellular tissue came away from the wound this day.

January 6. Somewhat improved, has had a good night, and asked for food this morning. The oppression about his chest relieved. Tongue foul, but not so very hard and dry. Pulse 90.

January 9. Had been apparently gaining a little strength, but appeared on this day to have relapsed again into a state of great debility; raved very much, and complained of pain in the arm, and oppression in the chest. Tongue very dry, chipped, fissured, and of a dark red colour.

Ordered.—A turpentine enema, a double quantity of wine, and the ammonia to be continued.

January 10. Bowels well opened by the injection, and he appeared relieved. Nothing in the world could equal the abominable fœtor of his evacuations.

It does not seem necessary to continue the minute daily reports of this patient's state. For some days he seemed to be hourly at the point of death, and to have been kept alive by wine, jelly, chicken, &c. At one period, diarrhœa came on with involuntary discharges from the bowels, a failing pulse, great prostration, and a tendency to gangrene, from pressure on the nates. The wound, however, continued to go on favourably. The ligature came away on the morning of the 17th day after the operation, without a drop of blood. The aneurism had diminished in size, and the uneasiness about the arm abated.

About the 21st day after the operation, matters began to assume a different complexion; he appeared to rally—to recover strength and spirits, and since that time he has continued to improve so much, as to have been able to be up for an hour or two on three different occasions. His state on this day (February 1, 1832) may be thus described. His countenance, of course, that of every old man, but its expression cheerful, and indicative of health; his tongue moist, but hard; no thirst, his appetite absolutely voracious; bowels regular, and the discharges natural; sleep sound and refreshing; pulse 80.

The wound is entirely healed, except at the minute spot where the ligature had hung out, where there is a small granulation. The aneurismal tumour has diminished nearly one half in size, and the coagulum can be felt firm and defined; no pulse, nor even a thrill perceptible in any artery in the limb beyond it. So far, this singular operation—singular in having been performed on so old a patient, and in the severe and protracted struggle which subsequently ensued—so far, it has been completely successful. The patient will be able to leave the Hospital in a few days, nor has he any further risk to encounter from the results of so formidable a disease, unless the aneurismal sac should suppurate; an event which has occasionally been observed to happen.

Art. VI.—*Observations on Isomerism.* By M. Dumas, Professor to the Polytechnic School. (Extracted from a Letter from the Author to M. Ampere.*)

Permit me, Sir, since I have now an opportunity, to communicate to you some reflections on Isomerism in general, without giving them more importance than they deserve. In a subject so new, who can hope to comprehend all?

Those bodies are called *Isomeric*, which, endowed with an apparently identical chemical composition, are nevertheless provided with characters which enable them to be distinguished. Sometimes these characters are so prominent, that the two compounds do not present the least similarity of properties, although their elementary composition may be absolutely the same. But we would restrict this grand phenomenon to a very narrow circle, if we would limit its applications to some rare cases, where it is evinced with more than ordinary intensity.

Isomerism, as all the great natural laws, far from becoming evident only in some marked instances, may assume a number of shades, and is capable of affecting all bodies in a manner more or less remarkable.

If we conceive a certain body endowed with a certain molecular arrangement, which it is possible to modify in a permanent manner, we can impress upon this body isomeric modifications more or less profound.

1st. The augmentation of cohesion, that of density, of hardness, a change of crystalline form, are, it appears to me, the first indices of isomerism. The chemical properties and the atomic weight remain unchanged. Thus the dimorphism of sulphur, and that of many other bodies, the new properties developed by heat in so many oxides, are

* Annales de Chimie et de Physique, tome xlvii. page 332.

in my opinion, the effects of a commencement of isomerism.

In all these bodies, for example, in arragonite and carbonate of lime, we may say without going farther, that the chemical compound is not altered, but that there is merely an approximation of its particles. There is no reason why we should not have two sugars, two alcohols, two acetic acids by this degree of alteration. It is indifferent to me, for they will present all the fundamental properties which serve me as guides.

2d. The molecular movement which determines the above-mentioned effects, continuing to act, we will have bodies of the same atómic weight, but with different chemical properties. These last have undergone, as I consider, a real metamorphosis, because the molecular groups of which their proper atoms are composed having been considerably altered, they present consequently new reactions. In this series are found the fulminic and cyanic acids, the tartaric and racemic acids, the phosphoric and pyrophosphoric acids, &c. &c.. If, as I consider in most of these cases, an oxacid is converted into an hydracid, the question is very delicate. Nevertheless, as the resources of chemistry always increase with its difficulties, I am persuaded that after some time we will be enabled to resolve them. As to the applications of my ideas to the composition of organic bodies, it is evident that the difficulty exists as much in inorganic as in organic chemistry, and that for one or other these ideas alone present a mode of escaping from it.

3d. Carried to a still greater degree of intensity, *isomerism* may present to the chemist, bodies possessed of characters so distinct, that not only the physical and chemical properties, but also the atomic weight may be changed. These effects may depend on two causes at least; in the first case the atom admits a greater number of elementary atoms; thus it happens with the different carburetted hy-

drogens, for gallic acid and ulmine, &c. In the second, the arrangement of the secondary constituents is evidently altered, as we see with regard to salicine and acetic ether, oxalo-vinic and succinic acids, oxamide and purpuric acid, urea and cyanite of ammonia, mannite and grape sugar, the new compounds formed by Woëhler and Liebig, &c. These examples, far from contradicting the ideas that I defend, powerfully support them, since the properties of the bodies cited show, that they are formed of different binary constituents, although having the same elementary composition.

Finally, when we compare the isomeric bodies of the second and third series which are as yet known, we see that the atomic weight either remains the same, or is multiplied by a whole number; that the chemical properties have in general no resemblance, and that in but few cases do we observe the phenomenon of isomorphism.

Art. VII.—*Observations on Secretion, and the intimate Structure of Glands.* By Robert J. Graves, M. D., M. R. I. A., Regius Professor of the Institutes of Medicine, one of the Physicians to the Meath Hospital, &c.

Secretion is one of the most constant functions of vitality, and indisputable traces of its operations are observable, not merely in highly organized beings, but in the lowest orders of animals and plants.

In its most general sense, secretion means the power possessed by any organ, or any part of the system, of forming from the blood peculiar animal fluids, whose chemical properties differ essentially from those of the blood itself.

I have said *fluids*, because it is now generally believed that *solids* are never directly formed by secretion. Thus the solid animal and saline materials of bone, are carried to the osseous texture in solution; and in like manner, the matter

of nails, hair, tendons, muscle, has all been deposited by a fluid separated or secreted from the general mass of the blood, and holding in solution the proper elements for the construction of the future solid. In this point of view it has been correctly remarked by John Bell, that every part of the body secretes, and that every surface, whether natural or produced by wounds, is a secreting surface; in fact, the growth, reparation, and nutrition, of the body, may in this sense be considered as affected by various modifications of secretion. It is not my intention, however, to consider *seeretion* in any other than the usual acceptation of the term, restricted as it is to the action of certain membranes, and particular organs called glands.

There are some general considerations with regard to secretion, involving questions of considerable interest; first, do the glands merely separate from the other component parts of the blood, the animal principles which, combined, form the secreted fluid? or do they actually re-arrange and compound the elements of the blood, so as to form new animal principles not previously existing in the blood? The latter hypothesis was universally received, until the discovery of new and unexpected facts rendered the former more probable, and has made most physiologists adopt the opinion, that the blood contains all the animal principles and chemical combinations found in the secretions. On this subject Andral thus expresses himself—(Translation by Townsend and West, vol. i. p. 440)—" The general conclusions which the facts just recorded naturally suggest, are, that the blood contains, in variable proportions, the elements of all the secretions; that in general these elements are separated from the blood only in certain organs, the peculiar structure of which favours that separation; and that after their separation they are so united and combined in their respective organs, as to form the different secretions."

This hypothesis agrees well with the facts, and explains

why urea makes its appearance in more than its usual quantity in the blood after extirpation of the kidneys, and why, when the liver, in consequence of inflammation or any other cause, has ceased to act, the constituents of the bile are deposited in other parts of the system, occasioning the disease called jaundice. If chemists succeed in detecting in the healthy blood, all the animal and saline ingredients found in the various secretions, and from the progress lately made in this department of animal chemistry, this seems by no means improbable, then the glands may be justly considered as mere organs destined to effect the separation of matters previously existing in the blood. But the question here arises, whence are these matters derived, and how are they obtained by the blood? No one will contend, that all or most of them exist in our food, such an assertion is opposed by numerous facts; there is not a particle of urea or lithic acid in the food of those who subsist on vegetables, and the same observation applies to the principles constituting bile; consequently we must conclude, that the food merely supplies the elements of the various matters, while the matters themselves are formed during the acts of digestion and sanguification. Great as is this power of the digestive organs and of the assimilative function, still the nature of the food, constituting as it were the raw materials on which the animal economy works, is not without its influence on the products of secretion; thus, Majendie found that he could produce very curious alterations in certain secretions, by gradually changing an animal's food, and he succeeded in making the bile and urine of some of the carniverous species, resemble the same fluids in herbiverous mammalia.

Facts analogous to this are well known to the practical physician, who seeks in many cases to alter and improve the state of the urine, in the treatment of diabetes, calculus, and gouty diseases, and I am persuaded that a sufficiently ample train of investigations concerning the effects of food

and medicines on the composition of the bile, would enable us to discover remedies capable of correcting various morbid conditions of the hepatic secretion, such as its containing an unnatural quantity of cholesterine, a consequence of which is the deposition of gall stones.

The secretions of different glands differ very much from each other in the number of their component parts. Thus, how numerous are the ingredients discovered in the urine and bile, compared with the secretions of a serous sac, or a mucous follicle. Nor is the structure of these respective glands more similar than their secretions; how much more complicated the liver and kidney than the simple sac or follicle? In fact, it may be laid down as a general law, *that in the same animal the glands and their secretions form two series, mutually corresponding to each other, simple glandular structure always producing a comparatively simple secretion, while glands of a more complicated texture uniformly produce a more compound secretion.*

We shall hereafter see, that this law, combined with facts just now to be mentioned, will suggest many interesting considerations concerning the nature of secretion.

The structure of glands, at one time almost exclusively engrossed the attention of anatomists and physicians, but in this country and in France, this subject has long ceased to engage the interest of the cultivators of medical science, a circumstance partly owing to the great authority of Bichat, who expressed himself in energetic terms concerning the inutility of such researches. The result of Bichat's example has been, that his followers have either altogether omitted the subject, or have treated it in a most cursory and superficial manner, so that their observations on the intimate structure of glands, contain scarcely more than an announcement of their own ignorance. I most cordially, therefore subscribe to the following observations of John Bell, on Bichat's method of treating this subject:

"I wish to speak with respect of Bichat, yet I cannot help saying, that it is edifying in a way which he did not intend, to find him thus expressing himself,—'Authors,' he says, 'have occupied themselves a great deal about the intimate structure of glands; Malpighi admits, that they are small bodies of a peculiar nature, and Ruysch has established, that they are entirely vascular. Let us neglect these idle questions, where neither the eye nor experience can be our guide; let us begin to study anatomy, where the structure of organs comes under the senses. The rigorous advance of science in this age, does not yield to *those frivolous hyphotheses,' &c.* Thus, continues Bell, Bichat does not retrace the steps of the mechanical philosophy, nor enter into the science of hydraulics, nor attach himself to the later school of chemical physiologists, but gives origin to a new school. He boils the liver, the kidney, and other glands; he dries them, boils them again, observes with all possible minuteness and gravity what floats in scum, what gets soft, what hardens by boiling. He smells and tastes, or he roasts the glands with the same ceremony, and still imagines the while, he is deeply philosophical." In quoting these observations of Bell, upon a particular part of Bichat's work, I by no means wish to detract from the general merits of that justly celebrated physiologist; but to prevent the undue influence of opinions expressed by so distingished a writer, who, himself neglected the indirect, but most certain methods of investigating the structure of our organs,—I mean the development of those organs in the fœtus, and their structure in other animals. Had he, in imitation of the example of Malpighi, used the instruction to be derived from these sources, he would have most probably surpassed, but never derided the Italian anatomist, who, it will be found, approximated to, although he did not actually arrive at the truth.

1. According to Malpighi, in the parenchyma of every gland, we can detect minute roundish bodies, which he supposed were again subdivided into still more minute and granular corpuscles.

2. Each of these corpuscles he considered as a glandular body, and the *acinus,* therefore, he looked upon as a collection of minute glands.

3. These ultimate corpuscles, he believed, were supplied with arterial blood, from minute arterial ramifications.

4. These latter, he conceived, to have patulous mouths opening into the structure of these minute granular glands.

5. Which patulous mouths poured forth into the hollow granules, or as he in other places terms them, the *follicular glands,* such a fluid as was most proper for the *completion and elaboration*—"*ibi foveri, mutari*"—of the secretion.

6. These hollow granules, according to Malpighi, had different shapes in different glands, and the extreme branches of the ducts destined to receive the secreted fluid, opened into them.

7. Thus, he supposed the hollow granules had both minute arteries and ducts opening into them, and consequently the ducts were in a manner continuous with the arteries.

8. Finally, Malpighi thought that the business of secretion is performed partly by these minute arteries, which separate a certain fluid from the blood, and partly by the granular glandules, in which that fluid undergoes its final elaboration.

Ruysch contended, that the *minute follicular gland* described by Malpighi, did not intervene between the terminal arteries, and incipient ducts, but might be altogether resolved into arteries, which again were *continuous with the ducts.*

Hence, Ruysch attributed the whole secreting power to

the arteries, and denied the existence of any intervening glandular body.

Malpighi believed the brain to be glandular, and he thought that the cortical substance of the kidnies consists of a mass of minute glands, traversed by innumerable serpentine vessels; he ranked the liver and the kidnies among the conglomerate glands.

Ruysch believed that the cortical substance of the kidnies might be wholly resolved into a mass of tortuous arteries and veins, which former had numberless branches patulous and continuous with the tubuli uriniferi of the central part.

On the whole, we shall find that Malpighi, who studied the structure of glands in fœtal developement, and in other animals, was much nearer the truth than Ruysch, who trusted to fine injections alone.*

It is remarkable, that the attention of physiologists had been hitherto exclusively confined to investigating the connexion between the *arteries* and *ducts*, while little disposition to ascertain the arrangement, shape, and structure of the ducts themselves was evinced by inquirers.

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* I cannot but differ from Müller, who says that Malpighi did not believe that the ultimate arteries were patulous, and actually opened into the glandules.

On the contrary, many passages of Malpighi's work prove, that he believed in the actual opening of the vessels into, and their direct communication by means of patulous mouths, with the glandular corpuscles, which he believed to be intermediate, between the vascular system, and the system of ducts.

Thus, speaking of the glands of the kidnies, he says, "Cum constet ex superius allatis extrema arteriarum in has copiosissimas glandulas hiare ;" also, the title of this chapter is, "De internis glandulis renalibus, earumque continuatione cum vasis."

Of the liver, he says, "et licet sensus non attingat extremas vasorum propagines, ad glandulosos acinos *hiantes*."

In fact, at that period, no one dreamed of a secretion from any thing but the MOUTHS of arteries, and as Müller himself observes, this opinion was subsequently propagated by the great Haller.

Ferreinius, in 1749, (l'Acad. Royale des Sciences de Paris,) was the first who entered upon this field, and who made the remarkable discovery, that the cortical substance of the kidnies, consists for the most part of *whitish cylindrical tubuli*, interwoven with each other.

Now we have seen that, according to the supposition of Malpighi, the cortical substance was believed to consist of *minute glands;* and according to that of Ruysch, entirely of convoluted vessels, and it is to be regretted, that the opinions of the latter anatomist especially, were too deeply rooted in the minds of physiologists, to allow them to attach the least credit to the discovery announced by Ferreinius.

In 1788, Schumlansky maintained a similar opinion, and succeeded in tracing the continuity of some of these serpentine and convoluted vessels of Ferreinius, into the straight tubuli, discovered in the medullary substance by Bellini. He still retained the error, however, of believing that many or most of them opened into the glands of Malpighi (*corpora Malpighiana*).

Thus, as Müller observes, some progress was made in discovering the true nature of glands, two of which, the testicles and kidney, were at this period sufficiently known, or rather intimated. In 1750, Duvernoi (in Comment. Acad. Scientiarum Petrop.) exposed the structure of the mammary gland in the hedge-hog, which he found to consist of ramifications of the lactiferous ducts, terminating every where in vesicles, arranged and subdivided like bunches of grapes. This celebrated observer was not, however, aware that this structure is not peculiar to this animal, but may, on the contrary, be found in many others. Mascagni and Cruikshank demonstrated its exis tence in the human mamma, by forcing injections through the lactiferous ducts.

Mascagni admitted that the ramifications of the ducts throughout the parenchyma, or substance of the gland, terminated in *culs de sac*, or cells, arranged and subdivided in the *Racemose manner*. This structure he was only able to *prove* by means of mercurial injections in the mamma; but he assumed its existence likewise in the liver and the kidnies. Mascagni was one of the first to deny the termination of arteries in ducts, or in gaping, open, and secreting mouths. He adopted the true opinion, that the arteries always *terminate* in veins. How then account for the presence of the secretion in the ducts, whose extremities, we have already seen, he believed to be closed? To meet this difficulty, he had recourse to another hypothesis, as little supported by facts, as the former, and assumed the existence of inorganic pores in the parietes of the capillary arteries, which are distributed to the internal surface of the *culs de sac* and cells, formed by the extremities of the minute ducts.

Cuvier, Doellinger, and Eisenhardt, were the next cultivators of this field, but their labours led to no well-founded general view, and it was not until the publication of Rathke's work at Halle, 1820, 1827, that science could boast of any solid acquisitions in this department; to which may be added, the valuable illustrations of the same subject, by Huschke, Baer, and Meckel, the substance of which will be found embodied in the following observations.

Having premised these observations upon the history of the anatomy of glands, it may be well to announce the proposition which expresses the present state of our knowledge upon this subject.

Besides possessing, like other organs, blood vessels, lymphatics, cellular membrane, and nerves, glands enclose within their substance one, several, or what is most usual, an immense number of cavities, blind or shut at their

terminations, but communicating freely with their larger branches, into which they open, and which again unite to form the ducts of the gland.

In general then, this peculiar system of cavities may be considered as forming the excretory ducts by their union, and are in fact minute subdivisions of its branches. These ultimate hollow ramifications of the duct, constitute therefore the distinguishing character of glands properly so called, and it is by means of them that the function of secretion is performed.

The culs de sac in which they terminate, are variously shaped in the different glands; in some few they are globular, but generally the terminal dilatation is much less considerable, and forms a sort of vesicular extremity, just as the minute bronchial tubes terminate in the air vesicles. The lungs, indeed, present the most familiar and intelligible example of this structure; they may be considered as glands destined to secrete from the blood various gaseous bodies, or different species of air. The trachea is the great duct of the lungs, through which the gases so secreted find a vent or are excreted. The bronchi, the bronchial tubes, and their subdivisions are identical with the ramifications of the ducts, and the air cells represent the terminal culs de sac; in the air cells, the secretion of air takes place from their internal surface, and in the other glands, we have every reason to believe that the internal surface of the terminal cul de sac is the organ of secretion. Now, a membranous surface possesses the power of secretion only in consequence of its vessels, and we must therefore suppose that every where secretion takes place from vessels distributed to the secreting surface. But as it is now acknowledged that vessels have no opening in their sides, and have no terminations but in veins, it is obvious that ultimately all secretions must take place through the parietes of vessels. The passage of fluids in the living body, through

organized membranes much thicker than the delicate parietes of minute capillaries, might be proved by many facts, and can be exemplified with membranes entirely deprived of life by experiments similar to those of Dutrochet on endosmose and exosmose. Hitherto we have supposed the secreting vessels to be ramified on the internal surface of the culs de sac, and that the secreted fluids penetrate the vascular parietes and so find their way into the commencements of the ducts. If this be the case, we are not to conclude that it necessarily follows, that we can therefore fill the ducts of the glands from the arteries which supply it with blood, for we know that our injections are stopped by obstacles which afford no obstruction to the passage of certain fluids in the living body; indeed it seems more than probable that when injections pass from the vascular system of a gland into its ducts, (as from the vena portæ into the pori biliarii, &c.) it is always in consequence of the parietes of the fine vessels above-mentioned being ruptured, and not because any openings in the sides of the ducts, or any direct inosculations with the minute arteries really exist in the living structure.

The view I have given of the relations between the secreting vessels, and the terminal extremities of the ducts is somewhat different from that of Mueller, who seems to think that the secreting capillaries form a sort of net-work around, but not in the very substance of the parietes of the culs de sac, or ultimate vesicles of the air cells. According to his view, the secretion must be effused in the parenchyma of the gland around the ultimate vesicles, and its entrance into the latter must be owing either to something similar to *endosmose*, or to vital absorption.

According to my hypothesis, on the contrary, it is from capillaries distributed to the internal surface of the ultimate vesicles, that the secretion takes place, exactly in the same way that the secretions from the surface of a synovial or a

serous membrane are derived from the vessels of these parts themselves,* and in the same way that the mucous secretions are owing to the vessels of the mucous membranes. Be this as it may, Mueller has succeeded in distinctly proving the analogy of structure which exists between glands, formerly believed to be constructed on plans essentially different, and he has shown, that as the ducts of the testicles terminate in a vast number of cul de sacs or tubular ramifications, long known and accurately described in all anatomical books, under the name of tubuli seminiferi, so the following other organs consist of ducts terminating in a similar way, and similarly related to the vessels of the part: the mammary glands, the salivary glands, the pancreas, kidnies, lungs and liver. The lungs, salivary, pancreatic and mammary glands, have the culs de sac of the ultimate ducts, more or less vesicular, or even globular; while in the liver, kidnies and testicles, the ducts terminate in an infinite number of very minute tubes, ending in cul de sacs without any dilatation at the extremity. The kidney alone contains two distinct structures, but they nevertheless consist, both cortical and medullary, of extremely minute tubuli. Those of the cortical substance are very long, contorted and convoluted in a most curious manner, and towards the termination of their course, when they are about to enter the medullary substance, they unite together, so as to form tubuli, comparatively few in number, and of larger diameter. But the tubuli of the medullary are not merely less numerous and larger in diameter than those of the cortical substance, but they are also straight in their course, tending in right lines to the papilla. From this structure it is evident, that the whole secretion is effected in the cortical, which are the terminal tubes, and that those of the central or medullary substance are merely

* The opinion of Rudolphi, that serous membranes, &c. do not contain vessels, is evidently untenable.

so many excretory ducts. This structure can be easily demonstrated in the kidney of the horse.

To arrive at a knowledge of the structural anatomy of several other glands, such as the liver and parotids, Mueller was obliged, not only to study their development in the mammalia, by examining them at very early periods of fœtal life, but he also found it necessary to examine them in birds, reptiles, and fishes, both in the adult state and during fœtal life. These researches made with a degree of minuteness and diligence truly admirable, led him to the conclusions already mentioned, conclusions he could never have arrived at by mere human anatomy. The manner in which he has traced and delineated, in the beautiful plates which accompany his work, the development of the liver in these various classes of animals, is most masterly and convincing. It is obvious that his discoveries have now for the first time proved the continuous nature of the chain which connects the structure of the most complicated, with that of the simplest glands. The sebaceous glands of the skin, and the mucous follicles of the intestines, are simple sacs closed at one extremity and discharging their secretions through the other. The amygdalæ and prostate consist of a number of somewhat similar lacunæ united together into a solid mass, but with the original type of their structure.

In the testicles, the lacunæ are prolonged into numberless minute and blind tubuli; but the same general plan is still apparent. It is in the remaining glands, the mammæ, the liver, &c., that the true nature of the structure presented the greatest difficulty, but this has been likewise surmounted. It remains for investigation, whether the lymphatic glands, and the placenta, do not belong to the class of glands; may not the arrangement of the lymphatic vessels in the former, be such as to place them and the veins in relations nearly similar to the vessels and ducts

of other glands; in short, may not the veins thus be considered as destined to receive some of the contents of the lymphatics in each gland? That they actually do so, and that a communication exists between them in these glands, has been incontestibly proved by experiment; the mode of communication has never been suggested. If the explanation I have given be correct, the use of the lymphatic glands is explained; they must be considered as numerous organs, destined for the collection of vessels carrying red blood, and vessels carrying white blood, arranged and mingled together in such a manner, that portions of the white blood pass into the system of red blood, in obedience to the same laws, which in the glands give rise to the passage of certain portions of the red blood from its proper vessels, into the system of ducts. If we bear in mind, that it is probable that a good deal of the detritus of the body is borne back to the circulation by the lymphatics—in short, that all the fluid they contain has been more or less used, we can conceive that it may be essential it should undergo a gradual elaboration in the numberless glands of this system, before it is poured into the general current of the circulation. In this point of view, these glands may be considered as calculated to effect a change in the lymph, by separating or secreting from it some of its constituents, and conveying them into the veins, by which means its mass is greatly diminished, and its nature altered, before it arrives at the thoracic duct, to join directly the venous system.

With regard to the placenta, I shall merely remark, that although our injections cannot be pushed from the vascular system of the mother into that of the fœtus, yet, the absence of a direct communication thus proved, by no means authorizes us to conclude, that the contents of the maternal vascular system may not be partly conveyed into the vascular system of the fœtus, in the same way that

the ducts of a gland, without having any direct communication with its arteries, nevertheless contain matters solely derived from these arteries. In this view of the subject, the umbilical vein of the fœtus is a duct, bearing the nutritive and necessary portions of the mother's blood carried to the placenta by the maternal arteries; and on the other hand, the maternal placental veins receive from the arteries of the fœtus, whatever it may be necessary to evacuate or eliminate from its blood. It is obvious, that several well-known, but hitherto unexplained physiological phenomena, as well as the placental nutrition of the fœtus, are explicable on this hypothesis; I advance it, however, with diffidence, and have now submitted it to consideration, chiefly with a view of exciting further discussion and investigation, concerning this obscure and difficult subject.

Art. VIII.—*Observations on the Preparation of Soap Cerate.* By William Ferguson, Esq.

As considerable difficulties have been encountered in the preparation of soap cerate, according to the formula of the London Pharmacopœia, a few observations on their cause, and the best method of making the preparation, may not be considered useless. The Pharmacopœia directs a pound of semivitreous oxide of lead to be boiled in a gallon of vinegar, till it incorporates with it, and eight ounces of soap having been dissolved in the solution, the water is to be evaporated slowly, and the residuum formed into a cerate, with oil and wax.

The properties of soap cerate depending entirely on the salt of lead which it contains, it is impracticable to make a useful preparation according to this formula. I have always found, that upon adding the soap to the solution of

subacetate of lead, an immediate decomposition of the materials takes place; the potash of the soap, decomposing the metallic salt, combines with its acid, and forms acetate of potash, while the oil unites with the oxide of lead, forming common lytharge plaster, which rolls about in a heavy mass in the solution of acetate of potash. Should the evaporation now be continued, the residuum, instead of consisting of subacetate of lead, combined mechanically with soap, will contain only lytharge plaster, acetate of potash, and a little protoxide of lead.

By a slight change in the process, a cerate may be made which will contain the metallic salt undecomposed, and in consequence be possessed of the properties expected to be found in the preparation. Instead of adding the soap to the un-evaporated solution of subacetate of lead, it should be boiled down slowly, till it is the consistence of treacle, and in that state be added to the other materials, melted together, and suffered to cool till they begin to grow white; the whole must now be stirred constantly while stiffening, like Turner's cerate, or ointment of the nitrate of mercury.

The quantity of vinegar necessary varies with the proportion of acetic acid it contains, 50 parts of acetic acid requiring 108 of lytharge to saturate them, about 7.28 ounces of pure acid will be sufficient to decompose 1 pound of lytharge; of purified pyroligneous acid (specific gravity, 1020,) 24.34 ounces contain the requisite quantity, but if common fruit vinegar (specific gravity 1014) is used, a little more than nine pints will be required; vinegar of this strength containing but one-twentieth of its weight of acetic acid. An inconvenience, however, attends the use of pyroligneous acid, as from the quantity of carbon precipitated during the evaporation, the cerate will be of a dark colour.

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A Treatise on the Diseases of the Heart and great Vessels, comprising a new View of the Physiology of the Heart's Action, according to which the physical Signs are explained. By J. Hope, M. D., &c. Kidd, London, 1832, pp. 612.

Dr. Hope commences his book by a statement of the circumstances which led him to venture on the perils of authorship. These were principally: the erroneous views of Laennec respecting the heart's action; the insufficiency of his theory of valvular murmurs; the limited and inconclusive nature of his investigations on aneurism of the aorta, and the spacious field of improvement which is offered in the treatment of diseases of the heart. He objects also to the work of Bertin and Bouillaud, on the ground that these authors hold that an hypertrophied and dilated state of the heart cannot produce symptoms of an obstructed circulation, a conclusion which his experience leads him to believe erroneous. These circumstances, together with the hope that his own investigation of the physiology and pathology of the heart would be found more correct than those of preceding authors, constitute the apology for his work.

The book is divided into six parts; 1st, the anatomy and physiology of the heart; 2nd, inflammatory affections; 3d, organic affections; 4th, nervous affections; 5th, miscellaneous affections; and 6th, cases.

> "In the execution of the work," says the author, "it has constantly been my aim, by studying the symptoms in connexion with the morbid anatomy, to trace the alliance of the two as cause and effect, and thus to reduce them to certain general and intelligible principles, which might not only contribute to future accuracy of observation, but facilitate the registration of so many and complicated facts in the memory."

We shall not attempt to give a perfect analysis of Dr. Hope's elaborate work, but confine ourselves to a consideration of a few of its leading points; and first, the author's

doctrine of the motions and sounds of the heart, a subject apparently so easy of investigation, but yet one which, more than any other, shews the difficulty of ascertaining even a simple truth in physiology. *A priori*, nothing more than vivisection and a mere inspection of the organ in a state of action seems necessary; it seems to be a mere question of ocular and acoustic observation; and yet we believe, that notwithstanding the labours of so many physiologists, this question is not yet cleared up; before, however, we enter into this part of the subject, we must protest against what may be termed the autocratism of science which is displayed by Dr. Hope. Will it be believed that Dr. Hope passes by in silence the labours, on this subject, of cotemporary authors, we allude to those of Pigeaux, in Paris, of Dr. Corrigan, and of Dr. Stokes, and Mr. Hart of Dublin; their investigations could not have been unknown to him unless by a culpable neglect; and on the other hand, if they were known to him, then his silence on the subject either showed that he feared to discuss them, or, what we are unwilling to believe, that he sought unjustly to obtain for himself the sole merit of controverting the opinions of the immortal author of auscultation.

We shall first examine Dr. Hope's theory of the motions, and next of the sounds of the heart. The first part of the theory, is, in all its essentials, that which has been developed by the above-mentioned authors, namely, that the process of contraction begins at the auricular and terminates at the ventricular portion of the heart: in other words, it is the confirmation of the doctrines taught by the older physiologists, Harvey, Haller, &c., a doctrine quite in accordance with the general motion of the blood. But he agrees with Laennec, in holding that the ventricular contraction is synchronous with the pulse, and that it is this contraction which causes the impulse at the side, conclusions quite opposed to those of the authors we have alluded to. We have carefully examined on this subject his first and second experiments, pp. 22—28, and cannot subscribe to his opinion, that the doctrine is inevitably deducible from the experiments. He says, that the re-expansion or diastole elevated the body of the ventricle more than its preceding contraction, and that the impulse took place when the ventricle was receding.

We submit that Dr. Hope has fallen into the error of confounding the sensation of resistance produced by the sudden and forcible contraction of the ventricle, with the impulse perceivable on the surface of the chest. To those

who have not made the experiments, we may mention, that there is here a source of fallacy, and that the only method of ascertaining what is the motion of the heart which produces the external impulse, is to place some body near to, but not in contact with, the apex of the heart during its action; if this be done, it will be seen that the impulse is given, not at the systole, but at the diastole of the ventricle. This does not appear to have been done by Dr. Hope. See Dr. Stokes' and Mr. Hart's Paper, *Edinburgh Medical and Surgical Journal*, and Dr. Corrigan's Essay in the *Dublin Medical Transactions*.

The author believes that the impulse at the side is produced by the ventricular contraction; 1st, because the auricular contraction is too inconsiderable to be capable of producing it. Without discussing this point, we may, however, refer to the very plausible opinion of Dr. Corrigan, that the auricular contraction has great influence on the impulse, an opinion supported by some remarkable cases, and one at least, which, considering its source, Dr. Hope should not have passed by in silence: 2nd, "*because the impulse occurs after the auricular contraction, and simultaneously with the ventricular, as ascertained by the sight and touch.*" Now, the first part of this proof tells both ways, and we have shewn the source of fallacy as to the second.

Dr. Hope says, "it is the apex of the heart which strikes the ribs;" in the ordinary state of the heart perhaps this may be true, but no one who has examined a patient labouring under hypertrophy with dilatation, and feels a body answering in sensation to the dimensions of the organ, and powerfully elevating the side to a great extent, can suppose for a moment, that it is the apex merely that strikes the side.

Let us now briefly examine the author's account of the sounds and rhythm of the heart. The first sound he admits to coincide with the impulse, a point on which all are agreed, but when he says, that it coincides with the ventricular systole, we think he is in error, at least we hold that he has failed in establishing the identity of these two phenomena. As to the second sound, we profess ourselves unable to reconcile the statements of the author. He says, "the ventricular contraction commences suddenly, but it is prolonged until an instant before the second sound, *which instant is occupied by the ventricular diastole.*" If this be true, it is clear that the ventricular diastole does not produce the second sound as it occurs before it. But in his tenth aphorism he declares "the second sound is produced by the

diastole of the ventricles," a statement diametrically opposed to the last: and here it is important to observe, that the second sound is often accompanied by a distinct impulse, not merely in cases of hypertrophy, but also where the heart is simply excited, without organic disease. This impulse is felt in the situation of the auricles. Dr. Hope notices this second impulse, and calls it the "*back stroke.*" He says, however, it is of a *receding nature.* If then, according to him, the second sound is caused by the diastole of the ventricles, we have the anomaly of a *receding impulse* accompanying the *active expansion* of the ventricles, and occurring in the *situation of the auricles.*

Before concluding these remarks on this portion of the work, we may notice two observations of Dr. Hope's, which go strongly to prove Dr. Corrigan's theory of the cause of the second sound, namely, that it is produced by the contact of the sides of the ventricle, at the moment of contraction. Dr. Hope found that the first and second sounds were heard, and the corresponding motions felt, while *the auricles were not contracting;* and secondly, when the heart was gorged towards the conclusion of the experiments, *the first sound only was heard.*

We fear that Dr. Hope has not added much to our knowledge of the motions and sounds of the heart. In the discovery of the error of Laennec as to the rhythm, he is not original, and for his other statements, the least we can say is, that they are inconclusive. For the labour which he has displayed in these researches, he deserves the thanks due to all who attempt to clear up any obscure physiological point.

The diagnosis of acute pericarditis, has long been a matter of difficulty, and the author very properly states the grounds on which it may be made in the present state of the science. It is principally founded on negative evidence, *as pointed out by Bertin.* Auscultation failing in a case to detect disease in the lung, we are thus led to fix the source of symptoms in the pericardium. The author says nothing about the sign given by Collin, of the sound produced by the rubbing of two rough surfaces on one another, a phenomenon which has been twice noticed in this city. On a subject where there is such difficulty, an omission of this kind is more to be regretted. Dr. Hope states, that a bellows' sound accompanying the first sound in most cases, and in a few occurring with both sounds, is a common symptom in acute and chronic pericarditis. This he mainly attributes to the violent action of the heart, but

in some cases supposes that it arises from a constriction of the orifices depending on acute inflammation of the internal membrane. We should not be surprized if its cause was found to be a modification of the phenomenon described by Collin, analogous to the *frottement* in cases of dry pleurisy, at least in some cases.

In discussing the opinions of Bertin on the subject of dilatation of the heart, the author announces a doctrine, which, to those not familiar with the writings of Laennec, would appear to be original. He assumes, by his silence on the opinions of the discoverer of the stethoscope, the merit of alone combating those of Bertin, which are that dilatation must always arise from a mechanical obstruction. All that Dr. Hope has said on this subject, has been already stated by Laennec, tom. II., p. 510, with this difference, that Laennec expresses in a few lines what Dr. Hope dedicates upwards of six pages to; and in his opinion, that dilatation alone will suffice to produce the symptoms of obstructed circulation, there is nothing original; see Laennec, Lancisi, and Corvisart. We may further remark, that no notice is taken by our author of the interesting researches of Piorry on this subject, see Journal Hebdomadaire. How far the difference of opinion of this author from Dr. Hope on the subject of blood-letting, has caused this silence, we shall not now inquire.

The effects of disease of the valves, in producing distressing symptoms, are supposed by Dr. Hope to be very slight, unless an alteration of the muscular portion of the heart coincides with the valvular affection. An entire chapter is dedicated to the elucidation of this proposition, which after all amounts to nothing but what Laennec has already stated, that slight valvular disease may exist without influencing either the *health or action of the heart;* if the disease be slight, the heart may escape appreciable lesion of structure or function; if it be severe, hypertrophy and dilatation will be the result, with a corresponding increase of symptoms. But surely this is no new doctrine.

Our limits will not permit us to pursue the analysis of Dr. Hope's work farther, but we feel bound to say, that the number of new facts which it contains, is not sufficient to apologize for its great diffuseness, and its want of what we may term the modesty of science. Comparisons are odious, but nevertheless, the work will be compared with those of Corvisart, Laennec, and Bertin, and in regret we declare our apprehension, that the result will not give it a pre-eminence.

A Treatise on Poisons, in relation to Medical Jurisprudence, Physiology, and the Practice of Physic. By Robert Christison, M. D., Professor of Medical Jurisprudence in the University of Edinburgh, pp. 824, Second Edition. Black, Edinburgh, 1832.

We hail the appearance of the second edition of this valuable work in so short a period after its first publication, as a proof of the advancement of legal medicine in this country, where, before the labours of Professor Christison, it had been almost unknown; and of the interest with which the members of our profession begin to examine into the action of poisonous agents, considered equally as a means of forwarding the cultivation of physiology and therapeutics, and as the only sound basis of a system of medical police.

The improvements in this edition are numerous and important, increasing the volume of the work by nearly two hundred pages, and consisting of various improvements in the methods of analysis of complex mixtures supposed to contain arsenic or mercury, and remarks upon numerous substances, whose toxic properties were not sufficiently known at the time of the publication of the first edition, but have been since recognized by experiment, or by the occurrence of cases of poisoning from their use; *e. g.* bromine, acetic acid, carbazotic acid, oxygen, &c.

To the chapter on evidences of general poisoning, considerable additions have been made; taking the work even solely upon the merits of that and the chapter on the physiological action of poisons, we would consider the library of a physician destitute of it, to be imperfect in a most material point. The impossibility of contracting within the limits of a bibliographic notice, the observations of Dr. Christison on medical evidence, without doing him injustice, alone prevents us from presenting to our readers an abstract of his remarks; we refer them, however, to the work itself, and hope, for their own sakes, they will not remain ignorant of it.

There are a few circumstances in the Treatise, to which we would direct Dr. Christison's attention, in order to their correction in a subsequent edition; they are not of very great importance, but, although trivial in themselves, their appearance in so eminent a work, gives them a degree of weight, which, under other circumstances, they would neither be entitled to or obtain.

Perforation of the intestinal canal by worms, is referred

to as a case which might be, in careless hands, confounded with irritant poisoning. Dr. Christison allows that this circumstance, (perforation by worms) is rare during life, but considers that it may happen, and relates three cases in which he considers it to have occurred: we would submit that in these cases, there is not even the most feeble proof of the lumbrici having caused the perforation; these animals are destitute of any organs capable of producing such erosion of our tissues; and we are sure that Professor Christison is too good a lawyer, to convict the poor entezoaires of having broken into the peritoneum, merely because they had been found in it; a situation nearly as fatal to them as to the patient.

We have seen many cases of fatal peritonitis with perforation, where worms were found either in the canal, or mixed with the sero-purulent liquor in the cavity; in all, however, there were many other ulcers, although less deeply sunken, and the whole aspect of the diseased intestine totally removed the possibility of the helminthes having been the cause of the disease.

One of the improvements in the analytic portion of the the work, is the adoption of morphia as a test for nitric acid, the fragment of the alcaloid becoming yellow, orange, or orange red, according as the acid liquor is more or less concentrated. We must object, however, to the use of this substance as a re-agent. It is not of very great delicacy, and if the liquor be at all coloured, it is totally inapplicable. We are surprised that Dr. Christison makes no mention of the copperas test for this acid, a mode of detection, which as far as our experience goes, is much more delicate and much less subject to fallacy, than either that by morphia or that by sulphate of indigo; by dropping a crystal of green sulphate of iron into the suspected liquor, if nitric acid be present uncombined, a black ring will immediately surround the crystal, and by operating on a white ground, and gently warming the solution, we have distinctly proved the existence of nitric acid, where neither the morphia nor the indigo test would act, unless chloride of sodium be added in using the latter, in which case it becomes of much less positive value.

Dr. Christison states, that in using the test of hydriodate of potash for corrosive sublimate, it is necessary to be cautious, as the precipitate is soluble in an excess of either. We are inclined to doubt the correctness of this statement, as even a very considerable excess of corrosive sublimate does not prevent the production of pre-

cipitate; the precipitate is, however, altered in colour; in place of the fine crimson, it appears rather reddish orange, in consequence of the formation of a certain quantity of proto-iodide of mercury. The pure bin-iodide alone is formed, if the solution of mercury be added to that of the ioduret of potassium. It is also stated in the same page, that "chloride of sodium, nitrate of potash, and probably other neutral salts, possess the power of dissolving the precipitate." We could not find them to have this effect; we have often precipitated small quantities of bin-iodide of mercury, from strong solutions of common salt and nitre, without finding the presence of these bodies any hindrance to the delicacy of the test.

A circumstance which prevents the use of the silver or iron tests for prussic acid, not mentioned by Professor Christison, is the presence of corrosive sublimate in the mixture; we mention it, because it once occasioned some embarrassment in the course of an analysis: no direct proof of the presence of prussic acid could be obtained from the mixture, the whole was thrown down by nitrate of silver, and the cyanide and chloride of that metal separated by boiling nitric acid, from its solution in which the cyanide was thrown down by potash.

The defects of Dr. Christison's book, it is evident, are not numerous, and when put in comparison with its many excellencies, weigh very light indeed: we would recommend the work to the attention of every man anxious to improve himself in the knowledge of this too much neglected part of his profession, and as far as our judgment goes, certainly consider it superior to any of the continental toxicologies.

An Introduction to the Atomic Theory, comprising a Sketch of the Opinions entertained by the most distinguished ancient and modern Philosophers, with respect to the Constitution of Matter. By Charles Daubeny, M. D., F. R. S., Professor of Chemistry in the University of Oxford. Murray, London, pp. 148.

The above title is sufficiently explanatory of the object of Professor Daubeny's work. It gives a good comprehensive view of the opinions of the ancient philosophers, with re-

gard to the constitution of matter; states the different theories of finite or of infinite divisibility with accuracy and clearness, and carries the history of the development of the modern atomic doctrine up to the most novel of existing hypotheses, the merorganized lucubrations of Dr. Prout. The book is intended for those students who have already made considerable progress in science, and therefore all matters merely initiatory or elementary are omitted, and considerable space consequently secured.

The body of the work is divided into four chapters, of which the first comprises an exceedingly well executed sketch of the opinions entertained respecting the constitution of matter, before the laws of definite proportion were discovered. The second contains the outline of those discoveries of modern science, by which the existence of atoms is put out of dispute. The third, a view of the principal applications of the atomic theory to practice; and the fourth, is composed of those arguments, derived from other branches of modern science, in favour of the existence of indivisible particles, and an inquiry into how far the doctrine of definite proportions may have been anticipated by the ancients. In an appendix some notes are added, the more important of which are, one by Dr. Prout, explaining more fully his doctrine of merorganization, and one by Mr. Dalton on certain circumstances of the laws of definite proportions.

In the second chapter, we are presented with an excellent account of the isomorphous bodies, but it is remarkable, that no notice whatsoever has been taken of the curious coincidence which is found to exist between the volumes of the atoms of the isomorphous bodies, a curious fact, which is capable of explaining, not only the cause of perfect isomorphism, but also that of substances being nearly, but not perfectly isomorphous, as the closer the atomic volume of the two substances approaches to identity, the more perfect is the resemblance between the crystalline forms of their corresponding compounds.

Another error of omission is that of total silence respecting the researches of Dulong and Petit, on the specific heat of the ultimate atoms; the constant number resulting from the multiplication of the atomic weight of a substance, by its capacity for caloric, and its use in ascertaining the atomic weight of bodies, whose specific heat is known, should certainly have insured some notice in a work evincing so much research, as that of the Oxford Professor.

The account of the *isomeric* bodies is finished by an exposition of the principle which Dr. Prout has brought forward, in order to explain the phenomenon of animalization. We do not agree perfectly with the opinion of Dr. Prout, considering as we do, that it is impossible to account for the difference of properties, between organized substances, by the existence of a mere trace of inorganic matter, *particularly as in most of those cases, it is proved by the labours of our best analysts, that no inorganic matter exists ;* nevertheless, we shall extract from Dr. Daubeny's work, a resumé of the doctrine of merorganization, in order that it may be contrasted with the account of isomerism, given in the present number of the Journal by Dumas.* The principle of merorganization, it is necessary to remark, has been fully adopted by Dr. Daubeny, who accounts, by means of it, for the therapeutic power of mineral springs, and therefore identifies himself with Dr. Prout in these opinions.

"Dr. Prout is of opinion, that some foreign body, not of itself belonging to the animal or vegetable kingdoms, necessarily enters into the constitution of every substance capable of being assimilated, and constituting a part of any organic structure. Bodies containing this admixture, he denominates *merorganized*, in order to express this supposed condition, implying, that in passing into this state, they become partly, or to a certain extent, organized.

"Now he accounts for the exceeding diversity of properties possessed by organic bodies, whose chemical composition is nearly identical, by the admixture of this small proportion of foreign matter, which by its presence, infuses new properties into the mass, and prevents the particles from arranging themselves in their natural crystalline figure.

"Thus, starch is *merorganized* sugar, differing only from the latter, by the presence of certain foreign matters, which effect a complete change in its characters." pp. 79, 80.

This is the doctrine advanced by Dr. Prout. In a letter published in an appendix to Dr. Daubeny's book, he modifies his opinion considerably, so as to render it more similar to the isomeric law, as described by Berzelius. Indeed Dr. Prout, although with an ostentatious modesty declining that honour, lays claim by implication, to the discovery of both isomorphism and isomerism, a claim

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* See page 40.

which sounds rather strange, coming from one who states with very great complacency, that "professional pursuits keep me away so much from chemical details, that it is very possible I may have committed some errors in the preceding observations."

In conclusion, we consider Dr. Daubeny's book to possess considerable merit, in giving a good history of the subject of which he treats, and to have appeared at a very opportune time, when the theory of atomic combination is probably about to undergo considerable alteration.

A Practical Compendium of Midwifery, being the Course of Lectures on Midwifery and on the Diseases of Women and Infants, delivered at St. Bartholomew's Hospital. By the late Robert Gooch, M. D., prepared for publication by George Skinner. London: Longman and Co., 12mo. pp. 358, 1831.

The French have a proverb which says, "*L'habit ne fait pas le Moine*," and the book whose *ingenious* title page stands at the head of these remarks, proves the truth of said proverb, shewing that a talented name, dexterously prefixed to a book, is not to be received in all cases as a guarantee for the excellence or value of the production.

The work before us is in reality not the genuine production of the distinguished man whose name it bears, but, as the editor himself informs us, the offspring of notes taken by him, the editor, when attending Dr. Gooch's lectures *as a pupil*, fourteen years ago, and consequently labouring under all the disadvantages of a slight knowledge of the subject, and therefore liable, as all learners are, to misunderstand, and consequently misrepresent, however unintentionally, for we wish to be clearly understood, as not intending by any such observation to impugn in the slightest degree the honour or integrity of the editor.

But if we waive altogether the former objection, we have another and perhaps more serious one to substitute, first premising, that in our opinion the publication of the volume is not calculated in any way to adorn the reputation of the deceased author, but, on the contrary, is likely in some respects to detract from his well earned fame, and this we most sincerely regret, being ourselves amongst the warmest of his many admirers.

From pages 181 and 200 we learn, that these lectures were delivered in 1818, consequently when Dr. Gooch was but young as a lecturer, and comparatively inexperienced as a practitioner in midwifery, since we are informed by his biographer in No. XIV. of the Family Library, p. 321, that it was in 1812 he became a lecturer, in conjunction with Dr. Thynne, and hence, as might be expected, although many parts of this book evince the acuteness of the lecturer, there are many of a very objectionable kind, and in giving publicity to which, we take leave to tell the editor, he neither consulted his own reputation, nor kept the pledge given in his dedicatory epistle " that nothing unworthy the character of the late Dr. Gooch should appear in these pages."

As to the division of the work into five lectures, we confess ourselves utterly unable to comprehend what could have been intended by it; this, however, was only a vagary of the editor's, and indeed is very much of a piece with his notes, which are, almost without exception, the most unprofitable effusions which have ever come under our observation.

Speaking of Dysmenorrhœa, the lecturer says, or is made to say, " Women labouring under this complaint, are barren," p. 20. Now this assertion, totally unrestricted as it is here given, must at once be acknowledged to be untrue; several instances to the contrary have come under our own observation, in one of which, a young lady who was subject to this disease, in a *very severe form*, married in May 1829, when she was 21, and we attended her in February 1830, when she gave birth to a full grown healthy male child.

Cancer uteri is discussed very briefly indeed, and amongst other things, it is remarked, that " dysury is *sometimes* experienced in the progress of the disease," p. 67. We presume, that those who have seen much of this disease, will join us in asserting, that a case of it, in which that symptom did not occur, would be a very rare exception.

On the subject of the corpus luteum, both lecturer and editor make but a sorry display of knowledge in physiology, and in facts; among other things, Gooch says, " When a woman has conceived twins, there is a corpus luteum in either ovary, *and not two in one ovary*," p. 84; this we can declare to be incorrect, from repeated observations, in which also, we have the support of Wm. Hunter, no mean authority on such subjects. " I have had opportunities of examining the ovaria with care in several cases

of twins, and always found two corpora lutea ; in some of these cases, there were *two distinct corpora lutea in one ovarium*, in others, there was a distinct corpus luteum in each ovarium."—Description of the Gravid Uterus, p. 14.

In the section on the signs of pregnancy, the following passage excited our utmost surprize: " during the first three or four months of pregnancy, the cervix uteri projects as far into the vagina, is just as long and *hard*, and the *os tincæ conveys the same impression to the touch as in the unimpregnated state.*" p. 102.

We can hardly credit that Gooch ever asserted such an error: however he either did or did not, if he did not, then the truth of our first objection, p. 68, is proved, and if he did, our second is made manifest; we incline to the former supposition, because in his very sensible Paper, published expressly on the subject, in 1829, we find no such opinion repeated, on the contrary we find him there stating " the examination of many has taught me, that the neck of the uterus is as much altered in some women at the fourth month, as in others at the sixth, especially in those who have had several children, in whom the neck yields more readily than in first pregnancies." p. 214.

Even in the work before us, it is laid down in another place, that " the changes of the uterus succeeding conception are not those of size only, but also of structure," p. 85. In short, we thought there was no fact better established than the change produced in the os uteri by impregnation, for although we are quite aware that other causes may give rise to such a change, we never before heard it asserted, that pregnancy could exist without it. Gardien expressly states, that the unaltered condition of the os uteri is a proof that the woman is not with child, tom. i. p. 504. Burns, in his Principles of Midwifery, 7th edit. says, p. 170, " *soon after conception* the os uteri becomes *softer*, often a *little closer*, and rather *circular* than transverse;" and Mauriceau (who by the by we are sorry to find has been misquoted, or rather misrepresented by Dr. Gooch, in a note, p. 213 of the Essay already referred to) thus speaks of the lower part of the cervix and os uteri: " When the woman is not with child it is a little longer and of a hard and close texture, but when pregnancy occurs it grows softer and thicker by degrees till about the sixth month," p. 39, tom. i.; and again at p. 97 of the same volume, this change is distinctly stated to take place immediately after the commencement of pregnancy.

In page 111 we find an instance of great carelessness, and

the misstatement of the facts of an important case, recorded by Mr. Vaughan, in which a lady was nearly starved to death by excessive vomiting during pregnancy, " it was therefore proposed that she should abstain from all food *four and twenty hours*, at which time her appetite returned, the vomiting ceased, and she recovered ;" such is the lecturer's statement, whereas if the original be referred to, Mem. Lond. Med. Soc. vol. II., p. 131, it will be found that the patient was kept *three days* without food, during which time the system was supported by nutritive baths and injections.

We feel pretty certain, that Dr. Gooch would never himself have put on record the opinion entertained in p. 112, relative to the pain in the right hypochondrium, which so frequently distresses pregnant women.

In page 128 there is a very mysterious sentence, in which women are spoken of " who are accustomed to spontaneous abortion before conception has taken place ;" this, however, we presume must be only an error of the press, uncorrected by the editor.

We turn with great pleasure to the chapters on natural and impeded labour, which are replete with excellent observations, and set forth many difficult and nice points of practice, in a very clear and forcible manner. We must, however, enter our protest against the general adoption of a direction, relative to the mode of performing craniotomy, for which purpose we are advised, p. 219, " to pass our *whole hand* into the vagina ;" the cases in which such a proceeding would be necessary or useful, are extremely rare indeed, and as it is at all times a terrifying and painful manœuvre, when not absolutely requisite, should be carefully avoided, as a cruel aggravation of suffering, already more than sufficiently great. We quite agree with Dr. Gooch, when he says, p. 215, " I have no faith in the vectis, it is proper only in a labour which is slightly retarded ; if the pains are gone, there is the more need of assistance, and we can depend only on the forceps."*

In page 184, Dr. Gooch discredits the efficacy of the Ergot of Rye, which, however, he acknowledges he never used ; upon this we need hardly remark, that during the last few years, this agent has been used successfully by

* " There is still a query, that if the forceps are so much better than the vectis, how is it that the vectis is still in use by some? For no other reason, but because it is easier to use ; for one instrument requires less skill than two, and for that reason it is preferred by those who have not more skill than they know what to do with."—London Practice of Midwifery, 5th edition, p. 185.

some of the first practitioners, in this and other countries; and considering this, we are no less surprised than amused, at the editor's note on the subject, where we find him declaring that, having "had many opportunities of putting it *fairly* to the test, he never witnessed, in any one instance, the slightest benefit from it." This reminds us of a similar assertion with regard to the power of digitalis, made by a late writer, who declares, that he never knew it in any one instance exert the slightest control over the circulation: to both we may say, that their testimony is as conclusive on the point, as that offered by the man who stole the spade, and being confronted by two credible witnesses, who swore they saw him take it, exclaimed in triumph, that he could prove his innocence at once, as he was ready to produce fifty witnesses who could swear they did not see him take it. Any remedy may be made unsuccessful by mismanagement, but one instance of decided success outweighs a hundred failures.

Having thus freely, and we trust fairly, pointed out some of the defects of this book, we cannot in justice dismiss it, without expressing our very warm approbation of many parts of it. The style, although occasionally very faulty, and even disfigured here and there with vulgarisms, is, in general, characterised by that felicitous turn of expression, which so peculiarly distinguishes the more finished writings of Dr. Gooch. In the discussion of several of the subjects, many of the rules of practice laid down are most excellent and worthy of recollection, while it must be confessed, some are slurred over, or treated with a brevity unsuited to their importance. Cancer uteri does not occupy four pages, and chronic inflammation of the same organ is discussed in less than a page and a half.

The directions for the management of the different species of labour, deserve our warmest commendation, and in short, we feel justified in recommending the volume to the attentive perusal of our professional brethren. We wish the work success, and hope that before it comes to a second edition, it may enjoy the advantage of a more competent editor, or that its present one will exert himself to correct errors, which he should never have allowed to be given to the world.

A Series of Experiments, performed for the Purpose of shewing, that Arteries may be obliterated without Ligature, Compression, or the Knife. By BENJAMIN PHILLIPS. London: Longman, 8vo. pp. 66, 1832.

FROM seeing serious consequences attendant on secondary hemorrhage, Mr. Phillips was induced to direct his attention to the discovery of a mode of obliterating the calibre of an artery, without any wound of the vessel capable of producing loss of blood. The occlusion of the tube being always produced by an inflammatory state of the internal coat being brought on, and adhesion taking place, or by the circulation being so slackened in that portion of the vessel, as to allow of the formation of a clot, which afterwards becomes organized, and adheres to the lining membrane; Mr. P. reflected, that if he could produce these states, viz. irritation of the inner coat, and formation of a clot, he could obliterate any vessel in any given portion of its course.

With this view, he performed the experiments detailed in the pamphlet under review; they were made on dogs, and the femoral and carotid were the arteries subjected to experiment.

Common sewing needles were plunged into the situation of the artery, so as to, if possible, transfix it. In many instances they did not do so; when removed at the expiration of twenty-four hours, little or no effect had been produced; but if the foreign bodies be left in the vessels for forty-eight or sixty hours, then a partial coagulum, feebly adherent to the sides of the vessel, is generally found, but in no instance did Mr. Phillips succeed in converting the artery into that dense, impervious, ligamentous band, which is found where the artery is obliterated by more effectual means.

In an appendix, Mr. P. proposes to assist the action of the needles by galvanism, and from our experience of the extremely dense mass of albumen, which forms around the positive pole in using electro-puncture, we can readily suppose it to be of considerable power. The great simplicity of the operation, and the absence of any danger, should at least gain it a trial in cases of aneurism, where there exists no great objection to a delay of a few days.

A Tabular View of the principal Signs furnished by Auscultation and Percussion, and of their Application to the Diagnosis of the Diseases of the Lungs. By RICHARD TOWNSEND, M. D., M. R. I. A., &c. &c. Dublin, 1832, Hodges and Smith.

IN this useful chart, all the physical phenomena of pulmonary disease are arranged, so that a person having made the examination of a case, and ascertained the signs present, is enabled, by reference to it, to at once ascertain what pathologic condition gives rise to the sufferings of his patient. It can be readily understood how very much this manner of conveying instruction must simplify the study of that important branch of medical science; it enables the tyro in stethoscopy, to seize at a glance the distinguishing character between diseases nearly similar in their general history; and contributes more to the obtaining a clear general notion of the principles upon which auscultation is practised, than the operose and extensive though valuable works of Laennec, &c., which, although absolutely indispensable to the senior student, yet tend more to the embarrassment than instruction of the junior.

The manner in which the chart is arranged, and the explanation of the causes of the different sounds given, reflects great credit upon the author, whose merits as a stethoscopist are well known. We would wish very much to see as a companion to this, a chart of the applications of auscultation and percussion to the diagnosis of the diseases of the heart and great vessels by the same author, without which we must consider the tabular view of the assistance furnished by the physical signs of disease, in practice, materially imperfect.

SCIENTIFIC INTELLIGENCE.

CHEMICAL SCIENCE.

Facile Preparation of Protoxide of Copper. By Woëhler and Liebig.—Dissolve copper in muriatic acid, to which small portions of nitric acid are added; afterwards evaporate to dryness, and heat the chloride obtained to its fusing point. It is thus converted into brown crystallized chloride. It is afterwards to be fused, 10 parts with 6 of dry carbonate of soda, in a covered crucible, at a low red heat. The mass is to be treated with water to dissolve the common salt formed. The protoxide of copper separates of a fine red colour, which is to be washed and dried.

The same process may be applied to the preparation of the protoxide of manganese. *Annales de Chimie*, 1831.

Preparation of Subchromate of Lead.—MM. Woëhler and Liebig have found that by fusing the neutral (yellow) chromate of lead with nitre, the above salt may be readily obtained, of as fine a red as the best cinnabar. The nitre is to be fused at a low red heat, and pure chromate of lead thrown into it at small portions at a time. On each addition of the chromate, strong effervescence occurs, occasioned by disengagement of gas, and the mass becomes black, because the chrome red (as it is technically called) appears black when it is hot. The yellow chromate is to be added, until all the nitre is decomposed. Care must be taken not to heat the crucible too strongly, because at too high a heat, the subchromate loses its beautiful colour, and becomes brown. The crucible is then to remain for some time, in order that the chrome red, which is heavy, may deposit, and the saline mass which is composed of chromate of potash and nitre, is to be poured off while fluid. This mass may be used again in the preparation of chromate of lead. The chrome red remaining in the crucible, is to be well washed with water and dried. If the saline solution be left in contact with the powder, it loses its fine red colour, and becomes dirty orange. The chrome red thus obtained, is a powder of a superb cinnabar red colour, which when procured cheap, will, no doubt, totally supersede the use of the mercurial preparation. *Annales de Chimie*, 1831.

Chemical Examination of the Parmelia Esculenta, a substance said to have been rained from the sky in Persia. By Professor Gobel of Dorpat.—" Dr. Parret gave me this lichen for analysis, stating that he had brought a substance with him from his journey to Ararat, which in the beginning of the year 1828 rained in several

districts of Persia, to a depth of five or six inches, and was eaten by the natives; it appeared to him to be of organic origin."

The result of my chemical investigation, convinced me that I had analysed either a lichen or a diseased imperfect plant which had probably been carried by the winds. In order to gain more information, I showed it to Professor Le Debour. He recognized it to be the parmelia esculenta, which he had frequently met with in his journey in the Kirghis Steppes, and in general in central Asia, on a dead loamy soil, or in the fissures of naked rocks, and that it suddenly shot out of the earth after rain. He is of opinion, that it appeared so suddenly, and in such quantity in Persia after very heavy rains, as to make the inhabitants believe it had fallen with the water.

It will probably afford a cheap source of oxalic acid; its composition is as follows:

Oxalate of Lime, - - - - -	65.91
Jelly, - - - - - - - - - -	23.00
Inulin, - - - - - - - -	2.50
Epidermis of Lichen, - - -	3.25
Bitter substance, soluble in water and spirit, - - - - - - -	1.00
Inodorous and tasteless soft resin, soluble in spirit of wine, - -	1.75
Soft resin, soluble in ether, -	1.75
	100

Schweigger Leidel's Journal, 1831.

Analysis of true Oil of Roses. By Professor Gobel.—"Through the goodness of one of my pupils from Tangarok, on the sea of Asoph, I received a vial of true oil of roses, which I dedicated to the following analysis:

"It was nearly colourless, but in so concentrated a state, that it gave out an insupportably strong rosaceous smell which caused headache, but when dissolved in spirit of wine, it afforded a most delightful odour. A single drop was sufficient to fill a room for several days with a most agreeable odour of roses. It congealed into a white foliated transparent mass when exposed to a temperature of 32° Fah. Spirit of wine, of 0.815, dissolved at 65.1 Fah., $\frac{1}{180}$ part of it. A drop required for its perfect solution, 8000 grains of water. Owing to the small quantity of oil in my possession, amounting to not more than 15 grains, it was impossible for me to separate the different substances of which it is composed, in order to analyse them. I was obliged, therefore, to rest satisfied with obtaining the proportions of the constituents which are as follows:"

Carbon, - - - -	69.65
Hydrogen, - - -	16.06
Oxygen, - - - -	14.29
	100.00

Schweigger Leidel's Jahrbuch, 1831.

New Chlorometer.—After having examined the utility of the very numerous modes hitherto proposed for ascertaining the strength of solutions of chlorine, and exposed their defects, arising principally from the nicety of manipulation required for their accurate employment, Henry and A. Plisson propose one in which the volume of the chlorine in the substance to be examined, is represented by a corresponding volume of a gaseous body, and thus a much greater degree of accuracy attainable in the hands of operatives.

The solution in water of chlorine, or of a chloride of an oxide, to be examined, is mixed with the solution of a salt of ammonia, or better, water of ammonia, and the mixture heated gently, the nitrogen disengaged is collected over water, rendered slightly alcaline to absorb any carbonic acid, and the quantity of chlorine calculated from the volume of nitrogen obtained.—*Journal de Pharmacie*, 1831, 573.

Chemical Composition of Tubercles.—Lassaigne has analysed tubercles of the lung and of the liver, obtained from the same subject; the following are the results obtained by him:

	Of the Lung.	Of the Liver.
Animal matter - -	40	- 50
Phosphate of lime -	35	- 45
Carbonate of lime -	9	- 4
Salts soluble in water	16	- 1
	100	100

He also examined a portion of a parietal bone which was considerably hypertrophied, its composition did not differ from that of healthy bone.—*Journal de Chimie Medicale, October et Novembre*, 1831.

Preparation of the Iodides of Mercury—M. Berthemot proposes the following mode as better than that usually followed for obtaining these powerful therapeutic agents.

The proto-iodide consists of one proportional of each of its constituents, or of 61.6 of mercury, and 38.4 of iodine per cent. These weights are therefore to be taken, put into a flat bottomed mortar and triturated together. The mixture soon acquires a reddish colour, and upon adding a few drops of the very strongest alcohol, and continuing to triturate it, will become yellowish green, and all the mercury and iodine will have disappeared. The alcohol will have evaporated, and a very fine proto-iodide formed.

The deuto-iodide of mercury consists of 1 atom of mercury united to 2 of iodine, or 44.51 and 55.49 per cent. These proportions are to be rubbed together, but the alcohol must be added drop by drop, otherwise much heat is given out, the action becomes very strong, and a quantity of the iodine is driven off. This process succeeds very well, and furnishes a compound of a known and definite

composition, although the colour is not so fine as that of the iodide prepared by precipitation.—*Journal de Pharmacie*, 1831, 456.

Compounds of Chlorine and Oxygen.—From an extensive series of researches, Soubeiran concludes that the substance hitherto known as the protoxide of chlorine, is not a definite compound, but a mere mixture in variable proportion of chlorine and of the deutoxide of chlorine. He considers also that the supposed chlorides of oxides are really combinations of an oxacid of chlorine (chlorous acid) with the oxide; a quantity of metallic chloride being simultaneously generated.—*Journal de Pharmacie, December*, 1831, *and Jan.* 1832.

Preparation of Iodic Acid.—The following mode of obtaining this acid is proposed by Mr. Connell. 50 grains of iodine are boiled in a large and tall flask with 1 oz. of fuming nitric acid: as soon as any iodine rises and condenses on the side of the flask, it is washed down again by agitation. After the process is continued for some time, a precipitation of white crystalline grains is observed to take place, and the operation is to be continued until the free iodine disappears. The whole is then evaporated to dryness. The acid thus obtained is in white crystalline grains, which contain a little nitric acid, from which they may be freed by a second crystallization when they loose their crystalline aspect, and become a whitish deliquescent mass, occasionally slightly purple, from the tendancy of the acid to decompose, if incautiously heated. The quantity of acid obtained is about equal to that of the iodine used.—*Jameson's Journal*, p. 72.

New Acid discovered in Lichen Vulpinus.—M. Bebert, apothecary, at Chamberg, has found that the lichen vulpinus, evernia vulpina, and other similar plants, owe their properties to a peculiar principle possessing acid properties, which he terms vulpuline or vulpinic acid.

This substance is crystallized, transparent, of a beautiful lemon yellow, unalterable in the air, fusible by heat, and assuming a crystalline texture on cooling, volatilized by an increase of heat without alteration; scarcely soluble in cold water, which, however, it colours yellow, very soluble in boiling water, and in hot strong alcohol, from which it is deposited in silky crystals, and occasionally in flattened rectangular prisms, soluble in ether and the fixed oils, and in the alkaline solutions. The watery solution may be evaporated to a sirup without crystallizing; it reddens litmus strongly, and its solution in ammonia, leaves, when evaporated, a residue from which potash liberates much ammonia, it therefore possesses acid properties.

The vulpuline is obtained by treating the lichen with boiling strong alcohol, from which solution it crystallizes confusedly by refrigeration; by redissolving and crystallization it is obtained pure.

This substance stains silk and woollen cloths bright yellow, which is permanent. The discoverer considers that it may be advantageously applied to dying.—*Journal de Pharmacie, December*, 1831.

Preparation of Chlorine Water.—Chevallier proposes for medical and economic purposes, a mode of preparing water saturated with chlorine gas of very easy execution.

When a large quantity is required for bleaching or other economic uses, he adds to about 125 gallons of water, 25 pounds of red oxide of lead in impalpable powder, 75 pounds of common salt, and 40 pounds of sulphuric acid, at 66°, Beaumè, Sp. Gr., 1.842. The whole contained in a barrell, is agitated by a movement of rotation for half an hour. It is then allowed to settle, and a clear liquor, exceedingly charged with chlorine, is drawn off. The sulphate of soda in solution is not injurious in any of the cases where chlorine is applied in medicine or the arts.

Where only a small quantity is required, he adds to a quart of water, 387.5 grs. of red oxide of lead, 620 grs. of sulphuric acid of the above strength, and 1162.5 grs. of common salt; in two minutes, a quart of strong chlorine water is obtained.

Sulphate of lead, mixed with a little peroxide, remains undissolved; the sulphate of soda exists with the chlorine in the liquor. *Journal de Chimie Medicale, December,* 1831.

Sulphates of Mercury.—Mr. Phillips has examined the composition of those salts. When two parts of mercury, and three of sulphuric acid are heated for a short time, some protosulphate of mercury is formed, but on continuing the heat, the whole becomes bipersulphate. This being put into water, is decomposed, and the yellow precipitate, formerly termed *turpeth mineral,* is thrown down. 200 parts of bipersulphate, yielded 141.1 of turpeth mineral, and then by heat, 8.4 parts more. On analysis, this salt was found to be a subpersulphate, constituted of

3 atoms Sulphuric Acid, -	120	or	12.2
4 —— Peroxide, - - -	864	or	87.8
	984		100

The acid and oxide remaining in the solution, have been supposed to constitute a peculiar supersalt; but when 4 atoms of bipersulphate of mercury are acted on by water, 3 atoms of acid, and 4 of oxide are precipitated, whilst 5 of acid remain in solution, this dissolving a part of the bipersulphate, prevents the decomposition of the whole, and the quantity remaining in solution, depends to a great extent on the quantity of water used. *Phil. Mag.* N. S. x., 205.

Organic Analysis.—Liebig uses the following method, which for substances containing azote, particularly when that principle is in small quantity, is found much superior to the modes formerly employed.

He burns the organic matter, by means of oxide of copper, in a very long tube. The water is absorbed by chloride of calcium, which is weighed before and after the operation. The carbonic acid is equally absorbed in the apparatus itself, by means of solution of caustic potash, which is weighed before and after the operation. If

the substance does not contain azote, the apparatus is open, and no gas is collected. To push forwards the carbonic acid which remains in the tube, recourse is not had to the disengagement of oxygen; a tube is employed, the posterior extremity of which is drawn out and turned up. When the combustion has ceased, the turned up end is cut off, and air drawn in by the opposite extremity. The air enters at the cut end, and displaces by degrees the carbonic acid which thus arrives at the solution of potash and is absorbed. This method applied to the analysis of azotated substances, allows of the nitrogen alone being collected under the gaseous form, and its weight may be calculated from its volume with the greatest possible accuracy. The quantity of water and of carbonic acid formed, is known by the increase of weight sustained by the chloride of calcium, and the solution of potash, during the experiment.—*Annales de Chimie*, 1831.

Composition of the Blood in Jaundice.—The following are the results of the analysis of icteric blood, for which the prize of the Royal Academy of Medicine of Paris was conferred on M. Lecanu. The blood drawn from a man 64 years of age, was fluid and slightly buffed; the serum of sp. gr. 1.027, was saffron-coloured, passing to canary yellow on the addition of water, and greening syrup of violets.

Having been mixed with alcohol, the albumen thrown down was separated, and the alcoholic liquor evaporated, the residue deliquescent, of a salty disagreeable taste, and of a deep yellow colour, was nearly all dissolved by ether. The undissolved portion consisted of organic matter partly soluble in water.

On evaporating the ethereal solution, a quantity of the orange-yellow oily matter mixed with crystals of cerebrine (phosphuretted fat of Denis) was obtained; and from the albuminous matters thrown down in the first instance by the alcohol, a green colouring matter, which by evaporation was separated into two, one of clear yellow, and the other of a bright blue colour. From the coagulum, besides the usual ingredients, still more of the colouring matter was obtained.

From his results it thus appears, that in the blood of icteric patients, there exists, besides the healthy constituents,

1. A combination of albumen and soda scarcely soluble in water.
2. An orange yellow colouring matter.
3. A blue colouring matter identical with the colouring matters which exist in the bile of man and other animals.

The blood in jaundice differs also from that in health with regard to the proportions of its normal constituents. The results of two analyses were,

Water - - -	828,66	-	830
Fibrine - -	1,87	-	2
Albumen - -	76,82	-	65
Colouring matter	77,75	-	95
Salts, &c. - -	14,90	-	8
	1000		1000

Journal de Pharmacie, October, 1831.

On the presence of Acetic Acid in the matters vomited by persons affected with Chronic Gastritis.—M. Mialhe and Joret have found in the clear mucous liquid vomited by dyspeptic patients, a quantity of acetic acid, to which was owing the acidity of this secretion.—*Journal de Pharmacie, November*, 1831, 622.

Composition of Sulphovinic Acid.—In consequence of the discordance between the results of Hennell, Serullas, Dumas, and Boullay, MM. Wöhler and Liebig have analysed sulphovinate of baryta operating upon a large quantity of the salt.

They found its composition to be

Sulphate of baryta - -	54,986
Sulphuric acid - - -	19,720
Carburetted hydrogen -	14,390
Water - - - - - -	9,100
*Water adherent to the salt	1,260
Loss - - - - - - -	0,644
	100,000

The atomic constitution would be

2 atoms sulphuric acid.
1 — baryta.
2 — carburetted hydrogen.
2 — water.

The water may be considered either as united to the carburetted hydrogen forming alcohol, or united to the anhydrous sulphuric acid, forming hydrated acid, which then unites to the carburetted hydrogen. M. M. Wöhler and Liebig prefer the latter supposition.

Production of Ammonia by the action of Nitric Acid on Sulphuretted Hydrogen. By Mr. J. Johnstone.—Mr. Johnstone has found that when sulphuretted hydrogen is passed through a solution containing free nitric acid, ammonia is formed by the decomposition of both, while the sulphur is partly acidified and partly precipitated in flocks; this is therefore important in analysis, particularly where it is required to estimate the quantity of nitric acid, as for every grain of ammonia formed, more than three grains of nitric acid are decomposed. The proper precautions against this source of fallacy should, therefore, be carefully observed.—*Brewster's Journal, Jan.* 1832.

Connexion between Thermal Springs and Volcanos.—Professor Daubeny has illustrated very well the *enchainement* of these inte-

* The salt could not be dried without decomposition.

resting natural phenomena. Thermal springs, he observes, are always found in either of three situations, 1st, near active or extinct volcanos; 2nd, in the neighbourhood of some of these chains of mountains which are acknowledged to have been raised up by volcanic action; or 3d, in some position, which, though remote from any of these leading systems of elevation, exhibits, either in its individual aspect, or in the general configuration of the surrounding country, marks of certain physical convulsions. Some warm springs reunite all three conditions, and many more the second and third.

Pr. D. having examined at large the geography of the principal springs, applies their chemical composition, and particularly the fact of their generally containing nitrogen, to account for their origin; and shews the insufficiency of the received hypotheses for the explanation. Adopting Sir H. Davy's view, of the centre of the earth containing the alcaline and earthy metals, and that the first origin of volcanic eruptions consists in water coming into contact with them, he explains the evolution of nitrogen, supposing it to be the residuum of the atmospheric air, which had rushed to fill up a partial vacuum in the volcano, and had given its oxygen to the hydrogen of the decomposed water, which fluid is therefore unceasingly decomposed and re-formed, which does away with the objection of Collier, that if the volcanic fire depended on the decomposition of water, the quantity of fluid in certain seas should be very much diminished.—*Jameson's Journal, January*, 1832.

New Mineral.—Boussingault has found that a mineral brought from Paramo Rico, where it is found in decomposed sienite, to possess the following composition:

Molybdate of lead ($Pb.^3 + Mo.$) (molybdas tri-plumbicus) - - - -	56,7
Carbonate of do. - - - -	17,5
Muriate of do. - - - - -	6,6
Phosphate of do. - - - - -	5,4
Chromate of do. - - - - -	3,6
Matrix - - - - - -	7,6
Uncombined oxide of lead - - -	0,7
	100

It occurs in small concretions, of a yellow colour, verging towards green, and a specific gravity of 6,00, temperature = 75° Fahrenheit. *Jameson's Journal, January*, 1832.

Fossil Forest discovered at Rome.—An interesting discovery has been made by a pedestrian tourist in the immediate vicinity of Rome, namely, that of an underground fossil forest, above forty feet in thickness, and extending for several miles. The petrific matter is a calc-sintar, and from the layers of ligneous debris being freely mixed with volcanic dust, the discoverer of this interesting circumstance

thinks there can be little doubt but that this colossal phenomenon was occasioned by an earthquake, the memory of which is lost.—*Jameson, January*, 1832.

Analysis of Plumbo-calcite, a Carbonate of Lime and Lead.—This mineral, found at Wanlock-head, is of a peculiar pearly lustre, crystallized in the primitive rhomb of carbonate of lime, is scratched by Iceland spar, of sp. gr. 2,824, its composition is

Carbonate of lime =	92,2	or =	30 atoms.
Carbonate of lead =	7,8	or =	1,014 atoms.
	100		

The crystalline form of the carbonate of lime was not altered by this admixture of carbonate of lead, the values of the angles in the imperfectly crystallized specimen examined by Dr. Brewster, being as nearly as could be observed, identical with those of pure carbonate of lime. Carbonate of lead is therefore perfectly isomorphous with carbonate of lime, and the volumes of their atoms must also be equal. *Brewster's Journal*, 1832.

Gelatinous principle of Fruits.—Braconnot has observed that the gelatinous principle of many fruits, as the currant, gooseberry, &c. possesses peculiar properties, and proposes for it the name of *pectine.*

It is obtained pure by precipitation by means of alcohol, from the expressed juice of fruits; having been separated by straining, it is washed and may then be dried into a mass like isinglass. It is soluble in cold water, and fixes into a mass like starch, is not acted on by iodine, and is immediately converted by the alcalies into pectic acid, but is not acted on by dilute acids.—*Annales de Chimie, Jouillet*, xlvii. 276.

Comparative decolorizing Power of Solution of Chlorine, and of a Chloride of an Oxide.—It is generally considered that the decolorizing power of a chloride of an oxide is equal to the quantity of chlorine which it contains; and it is so when the coloured substance is acid, because the chlorine is liberated by the acid from the oxide, and then acts upon the colouring matter. When tried by a substance not acid, as infusion of blue cabbage, the power of chloride of lime or soda is much inferior to water containing an equal quantity of chlorine, being only as 1 to 1,62 or 1 to 1,66. This difference of power goes far to prove that the mode of decoloration is different in the two cases.—*Soubeiran. Journal de Pharmacie, December*, 1831.

PHYSICAL SCIENCE.

Electric Origin of Terrestrial Magnetism.—From the researches of Biot and Kraft, it had been found that the phenomena of terrestrial magnetism cannot result from the earth possessing permanent magnetic properties, and that to agree with the observed phenomena, the magnetic poles, instead of being at the extremities of the axis, as in a permanent magnet, must be indefinitely near to one another and to the centre of the earth; finally, that the phenomena resembled those presented by a body in a state of transient magnetic induction.

When Ampere succeeded in conferring transient magnetic power by an electric current, Mr. Barlow endeavoured to apply this idea to the production of terrestrial magnetism, and has at length fully succeeded.

He procured a wooden globe sixteen inches in diameter, which was made hollow for the purpose of reducing its weight, and while still in the lathe, grooves were cut to represent an equator, and parallels of latitude at every $4\frac{1}{2}^{\circ}$ each way from the equator to the poles. These grooves were about one-eighth of an inch deep and broad, and lastly, a groove of the same breadth, but of double the depth, was cut like a meridian, from pole to pole, half round. These grooves were for the purpose of laying in the wire, which was effected thus. The middle of a copper wire nearly ninety feet long, and one tenth of an inch in diameter, was applied to the equatorial groove, so as to meet in the transverse meridian; it was then turned down that groove, one end towards one pole, the other towards the other pole, as far as the first parallel, it was then made to pass round this parallel, returned again along the meridian to the next parallel, then passed round this again, and so on until the wire was thus led in continuation from pole to pole.

The length of wire still remaining at each pole, was bound with varnished silk, to prevent contact, and then returned again from each pole, along the meridian groove, to the equator; at this point, each wire being fastened down with small staples, the two wires for the remaining five feet were bound together to near their common extremity, where they opened to form two points, for connecting the poles of a powerful galvanic battery. When this connexion was made, the wire became of course an electric conductor, and the whole surface of the globe was put into a state of transient magnetic induction, and consequently, agreeably to the laws of action above described, a neutralized needle freely suspended above such a globe, would arrange itself in a plane passing from pole to pole through the centre, and take different angles of inclination, according to its situation between the equator and either pole.

In order to render the experiment more strongly representative of the natural state of the earth, the globe in the state above described, was covered by the gores of a common globe, which were laid on so

as to bring the poles of this wire arrangement into the situation of the earth's magnetic poles, according to the best observations. They were therefore placed in latitude 72° N., and 72° S., and on the meridian corresponding with longitude 76° W., by means of which, the magnetic and true equators cut one another, in about 14° E., and 166° W. longitude.

The globe being thus completed, a delicate needle must be suspended above it, neutralized from the effects of the earth's magnetism, by which means it will become entirely under the superficial galvanic arrangement just described. Conceive now the globe to be placed so as to bring London into the zenith, then the two ends of the conducting wire being connected with the poles of the battery, it will be seen immediately, that the needle which was before indifferent to any direction, will have its north end depressed about 70°, as nearly as the eye can judge, which is the actual dip in London; it will also be directed towards the magnetic poles of this globe, thereby also showing a variation of about 24° or 25° to W., as is also the case in London. If now we turn the globe about on its support, so as to bring to the zenith, places equally distant with England from the magnetic pole, we shall find the dip remains the same, but the variation will continually change, becoming first zero, and then gradually increasing to the eastward, as happens on the earth. If again we turn the globe, so as to make the pole approach the zenith, the dip will increase till at the pole itself, the dip will become perfectly vertical. Making now the pole recede, the dip will decrease, till at the equator it vanishes, the needle becoming horizontal. Continuing the motion, and approaching the south pole, the south end of the needle will be found to dip, increasing continually from the equator to the pole, where it becomes again vertical, but reversed as regards its verticallity at the north pole.

Nothing can be expected or desired to represent more exactly on so small a scale, all the phenomena of terrestrial magnetism, than does this artificial globe; besides we know from the mathematical laws of action, that it is not merely an exhibition of effects, but that if we could increase our currents indefinitely, every circumstance of dip and direction would admit of actual and accurate computation.

Mr. Barlow finally considers the magnetism of the earth, to be a consequence of thermo-electric currents circulating in various lines over its surface.—*Phil. Trans.*, 1831. Part I. 109.

Conduction of Sound by Water.—It is well known, that when the instrument termed the *Syren* is put in motion by a column of water of sufficient elevation, a sound resulting from the vibrations of the liquid itself is produced, even when the instrument is completely submerged. M. Latour ascertained that by plunging himself into the water, and putting the *Syren* in motion, by injecting the liquid by means of a pump held in his hands, the sound increased in intensity the moment his ears were submerged, although his distance from the instrument remained the same; thus proving that the hy-

draulic vibrations were directly transmitted to the auricular organs with more energy, than when transmitted through the medium of the atmosphere.—*Journal of the Royal Institution*, No. v., 378.

Modification in the Phenomena of Newton's Rings.—In the question concerning the explanation of these rings by Newton's theory of fits, and by the rival theory of undulation, the leading difference is, that on the latter supposition, the portions of light reflected from both of the surfaces containing the thin plate of air are concerned, while in Newton's theory, the light reflected at the second surface alone, produces the colours which are observed. Professor Airy remarked, that an *experimentum crucis* might be made, if we could procure a kind of light which is capable of reflection from one of the surfaces, and not from the other. So long as the surfaces are of glass, this elimination of one of the portions of light is not possible, but if a lens be laid on a surface of *metal*, and the light incident be polarized light, at the polarizing angle, the rings ought to dissapear, if the doctrine of undulations be true, while on the other supposition, they ought to be seen. The phenomena thus predicted, were confirmed by an appeal to experiment, and the results found favourable to the doctrine of undulations.—*Brewster's Journal, January*, 1832, p. 94.

Magnetic Reaction of Platina.—In a piece of Russian platina, the size of a walnut, Gobel detected the two magnetic poles. Its magnetism was so powerful, that a middle sized needle was attracted by it, and a magnetic needle was at a certain distance set in motion by it. Many similar pieces of platina, from the size of a large nut, to that of a hen's egg, in the collection of the Imperial Mining Academy of St. Petersburgh, exhibit similar properties.—*Jameson's Journal, October*, 1832.

On the Progressive Expansion and Maximum Density of Water.—In a long and very elaborate memoir, having chiefly in view to determine the absolute weight of water contained in the Austrian standard measures, Professor Stampfer has obtained results differing considerably from the results of former experimenters.*

The maximum density he found to be at 3.75 C = 38°.75 F., and the expansions and densities above and below that point are contained in the following table.

Temperature.	Density.	Differences.	Volume.	Differences.
— 3 C.	0,999627		1,000373	
2	0,999731	104	1,000269	104
1	0,999818	87	1,000182	87

* Poggendorf's An. xxi. p. 75.

0	0,999887	69	1,000113	69
+ 1	0,999939	52	1,000061	52
2	0,999975	36	1,000025	36
3	0,999995	20	1,000005	20
3,75	1,000000	5	1,000000	5
4	0,999999	1	1,000001	1
5	0,999988	11	1,000012	11
6	0,999962	26	1,000038	26
7	0,999921	41	1,000079	41
8	0,999865	56	1,000135	56
9	0,999795	70	1,000205	70
10	0,999711	84	1,000289	84
11	0,999613	98	1,000387	98
12	0,999503	110	1,000497	110
13	0,999380	123	1,000620	123
14	0,999244	136	1,000757	137
15	0,999095	149	1,000906	149
16	0,998935	160	1,001066	160
17	0,998763	172	1,001239	173
18	0,998580	183	1,001422	183
19	0,998386	194	1,001617	195
20	0,998180	206	1,001822	205
21	0,997965	215	1,002039	217
22	0,997740	225	1,002265	226
23	0,997504	236	1,002502	237
24	0,997259	245	1,002749	247
25	0,997003	256	1,003005	256
26	0,996740	263	1,003271	266
27	0,996468	272	1,003545	274
28	0,996187	281	1,003828	283
29	0,995898	289	1,004119	291
30	0,995601	297	1,004418	299
31	0,995296	305	1,004726	308
+ 32 C.	0,994984	312	1,005041	315
33	0,994665	319	1,005363	322
34	0,994338	327	1,005694	331
35	0,994004	334	1,006032	338
36	0,993665	339	1,006375	343
37	0,993320	345	1,006725	350
38	0,992968	352	1,007081	356
39	0,992611	357	1,007444	363
40	0,992247	364	1,007813	369

Vibration of Sound.—M. Savart has communicated to the Royal Academy of Sciences of Paris, the results of his experiments made with an instrument invented by himself for the purpose of ascertaining the greatest and least number of vibrations per second of which

a sound may be composed so as to be perceptible to the human ear. He had previously ascertained that in one extreme, sounds resulting from more than 40,000 simple oscillations per second, may be distinctly perceived; and he now stated that in the other, sounds may be produced by his machine, which are not only perceptible, but even intense, although composed but of eight vibrations per second. The lowest limit of perceptible sounds produced without the aid of his machine was thirty-two vibrations per second.—*Journal of the Royal Institution, December*, 1831.

Double Images of Objects seen through Air.—M. Rozet has frequently observed double images of objects seen through air, he compares them to the images formed by doubly refracting spars, and goes so far as to say that the atmosphere has the property of occasionally giving two images, nearly as Iceland spar.

Whether the two images were repetitions of each other in the same direction, as in the case of Iceland spar, or whether there was an inversion of any part of the images, as happens in all ordinary atmospheric refractions, M. Rozet has not mentioned, although the distinction is a very important one with regard to the analogy referred to between the action of the air and doubly refracting hodies.—*Revue Encyclopedique.* Part I. 618.

BOTANY AND NATURAL HISTORY.

Respiration of Plants.—M. Dutrochet has made some researches to verify the experiments of Bonnet and Brogniart, on the aërial cavities of the lower surfaces of leaves, which were supposed to communicate with the atmosphere, and to serve for the reception of the principles concerned in the elaboration of the sap.

" Having observed that many leaves, particularly those of leguminous plants, lost the whitish tint of their lower surface on being plunged into water, he was induced to suppose that this phenomenon might be occasioned by the introduction of water into the cavities previously occupied by air. To ascertain this, he put a bean leaf into a glass vessel filled with water, and having completely submerged the leaf, he placed the vessel under the receiver of an air pump. As the air became exhausted, bubbles of air were seen to issue from the leaf, particularly from every point of the lower surface. After the lapse of half an hour the air was re-admitted, and the lower surface of the leaf instantly lost the whitish tint, which it had preserved until that moment. On taking the leaf out of the water, he found that the lower surface had, in fact, become precisely of the same colour as the upper surface; thus proving that the white tint of the lower surface of the leaf is entirely produced by the presence of air. Sometimes leaves appear to have white spots on the surface: these are proved

also to result from the same cause, and disappear as soon as the air is removed by the action of an air-pump. The introduction of the air into the parenchyma takes place through the openings of the *stomata*, which does not prevent those openings serving at the same time for the transpiration of the leaves and the absorption of atmospheric air. M. Dutrochet then ascertained, not only that there is an immediate and easy communication between these aërial cavities by means of all those parts of the leaf which are not separated by thick nerves, but that the aërial cavities of leaves form part of a pneumatic system, extending throughout the whole plant. To prove the direct correspondence between the aërial cavities of the leaves and the aërial canals of the petiole, M. Dutrochet plunged a leaf of the *Nymphæa lutea* into a glass vessel filled with water, leaving the severed extremity of the petiole out of the water. On placing the vessel under the receiver of an air-pump, and exhausting the air, he did not see any air issue from the submerged parts of the leaf; and on re-admitting the air into the vessel, a quarter of an hour afterwards, the lower part of the leaf retained its whitish tint, which proved that it had not lost the air which in its natural state filled its aërial cavities. M. Dutrochet then recommenced the experiment with the same leaf, taking care to submerge it entirely; and as soon as he began to exhaust the air, numerous air-bubbles escaped from the severed extremity of the petiole, but none from the edge or border of the leaf. When, however, the air was re-admitted, a quarter of an hour afterwards, the lower surface of the leaf instantly lost its whitish tint, and became as green as the upper surface; thus proving that the air had entirely escaped from the aërial cavities through the petiole, and that these cavities had become filled with water.

The hair or nap which is frequently found on leaves, particularly the lower surface, is considered by M. Dutrochet as being filled with air, and as forming the respiratory conduits of the nerves over which they are placed, while the *stomata* are seen in the intervals left between those nerves. In the rose-laurel the lower surface has no *stomata*, but is covered entirely with nap or hair.

It results, therefore, from the experiments of M. Dutrochet, that in every part of plants there are aërial organs, filled with a gas composed of oxygen and azote in variable proportions, but in which the oxygen is always in a smaller proportion than in the atmospheric air, which proves that it has been absorbed by the interior organs of the plant. The same circumstance is observed in analysing the air contained in the trachea of insects, which proves that their mode of respiration is the same; that is to say, the transport of respirable elastic air into all their parts. But the origin of this air is not quite the same, since insects derive it wholly from the atmosphere, while the plants generate a considerable part of it in their tissue by the influence of light. The azote, which is not absorbed in the internal respiration of the plants, is necessarily expelled; and, in fact, we perceive that flowers exhale a great deal of azote while they absorb oxygen, particularly under the influence of light. Leaves, on the

contrary, exhale oxygen when exposed to the solar light, and only respire in the shade or during the night. The oxygen which issues from the *stomata* when the leaf is subjected to the influence of light is only a part of what is produced; the rest passes from the aërial cavities into the conduits of the petiole, and thence into the whole vegetable tissue. And there is a continual production in the green matter exposed to the light, the oxygen as it is formed impels forward that which has been previously formed; and this mode of circulation supplies in vegetables the place of that which is produced in animals by muscular contraction.

Functions of Spiral Vessels.—From the researches of Dr. Bischoff of Bonn, it appears that the spiral vessels of plants contain no fluid, but serve exclusively to convey air, and that this air has from 7 to 8 per cent. more oxygen than the atmosphere. From the researches of the same author, it seems, that the spiral vessel is a delicate pellucid membranous tube, within which a spiral fibre is generated, that when the whole surface of the tube is filled up by the coils of the spiral fibre, a true spiral vessel is the result, and that spurious spiral vessels or ducts, with all their modifications, are formed by dislocations or separations of the spires within the membrane. Dotted ducts are, for instance, caused by the separation of the spiral fibre into minute points.—*Journal of the Royal Institution, December,* 1831. 417.

Ehrenberg's Researches on the Organization and Classification of the Infusorial Animals or Phytozoa.—The patient labour and enthusiastic spirit of investigation of the Berlin Professor have at length triumphed over the difficulties with which the minuteness of the objects of his researches strewed his path. He has raised the infusorial animals from the bottom of the scale of animated nature, to no small elevation in the organized kingdom; he has shown the great difference of structure evident amongst different genera of that interesting class of beings, and has abundantly proved, that very many of them possess a structure as complicated as that of many animals of what are called the higher classes.

By allowing the animals to feed on coloured vegetable solutions, he succeeded in tracing the intestinal canal throughout its entire course; the stomachs (in some cases, so numerous as 100 or 200,) and the intestines becoming filled with the colouring matter, and showing through the transparent animal.

The mouth varies in complexity very much; in some a simple uncovered opening, surrounded with ciliæ; in the *Hydatina Senta* it is provided with a pair of mandibles, each mandible possessing from two to six teeth, which when joined ingrain into one another like the fingers of the hands.

In some of the more highly organized of these phytozoa, Dr. Ehrenberg has detected an œsophagus and pancreas; in the animal before mentioned, (*Hydatina Senta,*) one of the largest of the class, (it

measuring nearly $\frac{1}{80}$ of a line in length,) a muscular system of considerable complexity is observed. The origins and insertions of a great number of distinct muscles have been described by Dr. E., and names given to them descriptive of their situation.

The generative system also is considerably developed in these animalcules; most individuals are hermaphrodite, possessing the completely formed male and female organs. The partizans of spontaneous generation, can no longer call upon these little beings to their support, for Ehrenberg has followed the exercise of the fecundating process in all its stages, and has proved the existence in this class, of the whole three species of generation, the viviparous, oviparous, and gemmiparous.

In the *Hydatina* alone, was the evidence of the existence of a vascular system convincing; it consists of a dorsal vessel, from which arise at right angles, numerous branches, passing to all parts of the animal. In this genus also, Dr. Ehrenberg has shown the presence of a number of grey roundish bodies, lying on the intestinal canal, and sending off numerous twigs, many of which communicate. These bodies, he considers to be ganglia, and thus the phytozoa are furnished, at least in the more perfectly organized classes, with a perfect nervous apparatus of organic life.

Cryptogamia in Molasses.—Van Dyke and Van Beck of Utrecht, have observed a black substance in molasses, which rapidly increases and enlarges, and is according to them a cryptogamous plant, identical with *Syncollesia Mucoroïdes* of Agardh. The Dutch authors make a species of that described above, *Syncollesia Sacchari,* different from many other similar vegetables which have been observed in molasses.

These mouldy productions appear to be due to the impure waters with which the sugar moulds are washed; lime water kills them.

ANATOMY AND PHYSIOLOGY.

Connexion of Muscular Action with Vision. By Mr. Shaw.—Writers have all agreed in representing that the idea of the 'direction' in which objects are seen is obtained immediately from the retina or nerve of vision. They suppose that this nerve can convey to the mind a sensation of the course in which the rays have proceeded from the object to impinge upon it; or, in other words, that the retina can receive an impression, not only of the object, but of the direction in which the object is presented to it. Founding upon this as a true position, they find it easy to frame what they consider to be a just explanation of the problem. In an inverted image, they assert, the retina does not convey the impression of its particular parts being

inverted; but each point in the image is judged to be in the direction in which the rays have proceeded in falling upon it; the uppermost pencil of rays from the object, falling upon the lowest part of the image, gives the sensation of its proceeding from the highest part, and consequently makes that part appear to be at the top, instead of at the bottom; and so, they say, it holds with regard to the lowest rays and all the others. To use Dr. Brewster's words, the retina 'sees along the lines of visible direction;' that is, the lines which lead from the image in the direction of the object.

Such is the leading proposition on which the whole theory is rested. But it is surely an error to assume that the retina possesses such a power as is here attributed to it. If we ask—What is the meaning conveyed by the words 'visible direction'?—it will be seen, on reflection, that they include something more than a simple sensation obtained through an organ of sense. To acquire the idea conveyed by the term 'direction' alone, it is necessary that there should be a comparison; that is to say, an operation of the mind itself. We can only form the idea of the particular quarter or situation in which a body is placed, by informing ourselves of its position in regard to another, which has been previously fixed upon as the standard of our comparison. To say, then, that our knowledge of 'direction' can be obtained at once, and can be conveyed to the sensorium like an impression through the optic nerve, is to employ the term in a vague and loose manner, which must necessarily lead into error.

The muscles have the power of turning the eyeball either towards the object or in a contrary direction. Of this we are conscious. Now, it appears to be a simple conclusion to arrive at, that the object must have a separate existence of its own, and distinct from the eye which perceives it; when in order to see the same object, we invariably find that it is necessary to exercise the muscles in a particular manner. We know that, if the body presented to our sight be in motion, as a bird flying through the air, we must follow it with our eyes, making fresh efforts to keep them in the direction of its flight, otherwise it will disappear. If the image were a mere spectrum, as that produced by looking at the sun, it would present itself in whichever direction we happened to turn our eyes. Hence it follows that, even without calling the sense of touch or any of the remaining senses into operation, but depending upon the knowledge acquired from merely shifting the eye about, we become convinced that the body whose image is in the eye exists externally. To 'trace' or 'see along' a line, as the expression is used, includes the opinion that the object is placed externally; it likewise includes the idea of guiding or directing the eye; and, in addition to these, it implies the existence of a coloured image painted upon the retina. The notion conveyed by these words is, therefore, most complicated; and they ought never to have been applied, as has been done, in speaking of the functions of a single nerve.

In common language we are accustomed to speak of 'directing'

the eye: it is allowed also, that it is by a voluntary act that we accomplish this; but it is not so generally conceded that the exercise of the muscles, by which the eye is moved, communicates a distinct sensation to the mind; and yet it forms an important part in the process of vision. There is a sensibility resident in the muscles which gives token of the degree of their contractions; and it is by attending to these impressions that we become conscious of the direction of objects.

Let us observe what takes place during vision, and we shall perceive how intimately this 'sense' of the muscular actions is connected with the question before us. When we look at an object placed high above us, the first thing which we naturally do is to throw back the head, to turn the face towards the skies, to elevate the upper eyelids, and to raise the cornea of both eyes upwards. Now these actions are not performed without our knowledge. If we have to inspect an object which is placed on one side, we may be obliged to wheel round before we can see it; at all events it will be necessary to turn the eyeball in the socket towards that side. If we have to examine an object placed at our feet, there is first a corresponding motion of the eyeball and of the head, or it may be of the whole body, in order to be enabled to look downwards. These motions of the frame, accompanying vision, are familiar to all persons. We can even tell, at a distance, in what direction a person is looking, by observing the position of his body; and if we can see his eyes, we may tell whether he is looking at ourselves, or the particular spot that engages his attention.

Thus it would appear that the motions of the body and of the eyeball together, constitute an important part in our perception through the organ of vision. The consciousness of the action of the muscles accompanies the sensation which the retina bestows; and it is the almost simultaneous reception of these two different kinds of sensation, added to the effects of early habit in associating them, that gives rise to the common feeling of their both being obtained from the exercise of the same sense.

Thus we judge of the direction of the various parts of a body by ascertaining in what position we must place the eye, in order to see it distinctly. When a tree, for example, is presented to our view, we direct the eyes downwards to observe its trunk rooted in the earth—we turn them upwards to see its uppermost branch; and we turn them to each side to see the right and left sides of the tree: and it is by referring to these motions that we conclude that one part is above, or another is below. In all of these motions, however rapidly performed, a distinct sensation accompanies the change; and this is communicated to the mind as surely as is the impression upon the retina itself.

Examination of the Eggs of the Helix Hortensis.—On the 15th of August, a letter was read to the Academy of Sciences, from M. Turpin, containing some particulars of the microscopic analysis

of the egg of the garden snail (*Helix Hortensis.*) When the exterior of this egg is viewed through a strong magnifying glass, the shining surface presents an infinity of white points, which appear, as it were, drowned in the soft mucous and transparent envelope of the egg. When an egg is crushed between two plates of glass, all the viscous and albuminous liquid which it contains is scattered abroad, and the torn membrane remains empty. If the whole be then viewed through a microscope having a two-hundred times magnifying power, a prodigious quantity of very beautiful pointed white and translucid rhomboidal crystals, regularly formed in their angles and sides, are clearly distinguished. These rhomboids are of unequal dimensions, the largest being about 100th part of a millimetre (.0004 of an inch.) Some are single, and others grouped together by two, three, four, five, and six; all are fixed or glued against the interior surface of the envelope of the egg. Among these rhomboids are found a few cubes, and some regular prisms with square bases. The number of these crystals is so considerable, that they may be considered as forming at least half the volume of the egg. The white external points above mentioned indicate the crystals which line the interior surface of the envelope. After these crystals have remained six days between glass plates, their form gradually alters, their angles become rounded, their beautiful white changes to a yellow hue, and they are in a great degree liquefied. These crystals were observed by M. Turpin in an egg laid by a snail on his table, and instantly examined with the microscope; whence he considers it probable that they are formed in the egg while it is yet in the ovary of the mother, in the same manner as similar crystallizations are formed in the cellular tissues of plants, particularly those of the genus Cactus.

Adaptive Powers of the Eye.—Mr. Morton has brought forward many ingenious proofs that the power of adaptation to distance, is possessed by the organ of vision, in consequence of the great capability of the iris to contract or to enlarge the aperture by which the rays of light are admitted to the retina; he says, " if the eye be directed for a moment towards the sun, the pupil attains its least diameter. The reverse takes place in the entire absence of light, the pupil is enlarged to its greatest extent. Such a provision was necessary to guard the delicate organ from the effects of intense light, but experiment and observation would lead to the conclusion, that the iris, besides possessing this instinctive power of self-preservation, influences directly the function of vision, that while it excludes from the eye too intense a light, at the same time it has the power of admitting such rays as are necessary for distinct vision. We might consider the iris as acting under two kinds of sensibility, or perhaps mere modifications of the same sympathy, that sensibility which protects the retina from too much light, and that visual sensibility (if we may be allowed the term,) which, when the iris has adapted itself to the intensity of light of the surrounding medium,

adapts the pupil to the admission of only those rays which are requisite for distinct vision. To be assured of this, we have only to observe the eye while performing its function of vision, when it is directed generally to a distant prospect: the iris is adapted to that degree of light consistent with its normal function, but the instant an object is singled out in the distant prospect, we can observe a sensible alteration in the diameter of the pupil, the result of a new impulse, and on close examination, the iris will be found to vacillate as the object singled out is more or less *distinctly* seen; or perhaps it would be more correct to say, the object becomes more or less distinct in accordance with the motion of the iris. The motions of the iris when objects are viewed at different distances, has been observed; but sufficient importance has not been attached to it. Under the influence of solar light, this visual sensibility of the iris is much less apparent than in its absence; its motion, however, is sufficiently evident even to the naked eye, but in a more obscure light is palpably manifest."

Mr. M. brings forward in support of his opinion many pathologic facts, where as in iritis, &c. indistinctness of vision from a failure of the adaptive powers, arises from disease of the iris.—*American Journal, Medical Science, November* 1831. 60.

Anomaly in the Pneumogastric Nerves.—M. Bignandi communicated to the Anatomical Society of Paris, the dissection of a woman, in whom both pneumogastric nerves presented in their whole course a series of ganglions, some as large, others smaller than the intervertebral ganglions which they resembled in their structure. The great sympathetic of the left side was atrophied, and on this side the ganglions of the pneumogastric were both larger and more numerous. This woman, through life, exhibited nothing remarkable, except that she had a most *voracious* appetite.

Structure of the Placenta. By Dr. R. Lee.—The author of the present paper having had opportunities of examining six gravid uteri, and many placentæ expelled in natural labour, finds reason to conclude that no cellular structure, such as that described by Dr. Hunter, exists in the human placenta, and that there is no connexion between this organ and the uterus by great arteries and veins. He thinks himself warranted in concluding, that the placenta does not consist of two portions, maternal and fœtal, but that the whole of the blood sent to the uterus by the spermatic and hypogastric arteries, except the small portion supplied to its parietes and to the membrana decidua by the inner membrane of the uterus, flows into the uterine veins or sinuses; and, after circulating through them, is returned into the general circulation of the mother by the spermatic and hypogastric veins, without entering the substance of the placenta. Such have been the results of the author's own examinations of the structure of the gravid uterus, both when injected and un-injected; and also of an examination of the preparations of that organ, contained in the Hunterian

Museum at Glasgow, made at his request by Dr. Nimmo. These views are also corroborated by the careful examination by the author of a preparation of the uterus with the placenta adhering to its inner surface, in the Museum of the Royal College of Surgeons of London, which is supposed to have been put up by Mr. Hunter himself nearly fifty years ago. The cellular structure of the placenta has been too hastily inferred from the masses of wax found interspersed in its substance, after the vessels have been injected; but this appearance the author ascribes wholly to extravasation in consequence of rupture of the vessels.—*Philosophical Magazine, February,* 1832.

PATHOLOGY AND THERAPEUTICS.

Microscopic Researches on the Blood in Disease.—M. Donné has been examining with the microscope the composition of the blood in morbid states of the body.

In many diseases the form of the globules is altered. In an individual in good health the globules of the blood are perfectly round, transparent in the centre, and of an equal diameter. In a person worn out by long illness, whose organs have undergone perceptible alterations, the globules are less numerous, smaller, deformed, and their general and regular equality is gone. M. Donné asserts the following facts.

1. In the blood of a woman twenty-six years of age, dead of gangrene of the lung, and the body emitting the odour of putrefaction, the globules were small and remarkably deformed.

2. In the blood of a woman dead of puerperal peritonitis, the globules were less deformed than in the preceding instance, but they could not be clearly made out. The fluid effused into the abdomen presented a few, very deformed globules.

3. In the serum of the blood of a woman, who had suffered for some time from disease of the brain, and was bled on account of erysipelas, the globules were very small and few; the blood of the clot did not offer a very regular form.

4. In the blood of a man who was bled for bilious pneumonia, the globules were fine, and tended to become united together.

5. Serum of a young girl affected with bilious fever: globules well marked, not very transparent.

6. Blood of a woman dead of dropsy: globules in very small number.

7. Blood of a woman dead of disease of liver: globules tolerable, but disposed to be deformed.

8. Blood of a young man dead of acute peritonitis, treated by mercurial frictions: globules very deformed.

9. Blood of another young man under similar circumstances: globules not possessing their natural form, and some amongst them very large.

Appended to the foregoing are some statements concerning the existence of animalculæ in animal fluids. We all know of the discovery, or reputed discovery, of animalculæ in the semen by Spallanzani, and many know that a subsequent physiologist has accurately described their motions and habits. M. Donné has ascertained that these animalculæ do not exist in the secretion of the prostate. M. Donné has discovered in a perfectly transparent liquid contained in an ovarian cyst, some very small living animalculæ. They appeared composed of a series of rings, and the termination at each extremity was obscure. They swam slowly by bending their bodies alternately to right and left, and they were of so minute a size, as not to be more than one-tenth as large as the spermatic animalculæ.—*Med. Chir. Rev.*

Connexion of Albuminous Urine with Diseased Kidney.—In the January number of the Edinburgh Medical and Surgical Journal, Dr. Gregory continues his remarks on the nature of this interesting pathologic condition, and relates numerous cases where the disease was cured: his final conclusions are, that this disease is comparatively rare in children and young persons, that dropsy is an usual, though by no means a necessary concomitant symptom of the diseased kidney; that in about one-half of the cases, alterations of the thoracic and abdominal organs are met with, but that the pathologic character of the malady, and the cause of the most prominent and pathognomic symptom (the presence of albumen in the urine) is the peculiar granular alteration of the kidney, first described by Bright.

This disease is very insidious in its progress in a great number of cases, its first approaches are marked by pains in the loins, sometimes dull, sometimes acute, increased on pressure or motion, in some constant, in others occasional, and in several, shooting round the abdomen, and stretching down the thighs.

With regard to treatment, Dr. G. coincides with the observations of Bright and Christison; he found cream of tartar to be more powerful in reducing the œdematous effusions, and more certain in its action than any other of the diuretics that he tried; he used opium for checking diarrhœa and vomiting, in those cases in which they occurred.

Dr. Gregory subjoins some tables of the specific gravities of numerous specimens of urine in this disease, and in a state of health. The specific gravity of albuminous urine varies from 1004.5 to 1023.5, and the average as determined by Dr. G., is about 1013.18. From an examination of the specific gravity of healthy urine in fifty cases, the average appears to be about 1024.73, a result far above the average in the cases of disease. The specific gravity of the urine furnishes us, therefore, with an excellent diagnostic sign, and can in a great degree, show the advance of the patient towards convalescence, or otherwise.

Physiological Effects of Bromide of Mercury.—M. Werneck has ascertained the action of the combinations of bromine and mercury upon the system.

The proto-bromide is tasteless and inodorous, volatilizes without decomposition, but alkalies decompose it, throwing down protoxide of mercury, while the bromine unites to the alkaline metal. Administered in doses of from one to three grains, the proto-bromide of mercury does not produce any sensible effects, even when the individual was fasting; however, in a young boy, two grains of the medicine provoked at the end of five hours, two liquid greenish stools, unaccompanied by pain. In doses of 4, 5, or 6 grains, the proto-bromide determined numerous liquid stools.

As to its action on the diseased body, this agent, which is totally insoluble in water or alcohol, is found to resemble very closely calomel. The author has used it frequently in primary syphilis, and in cases of apthæ, both in children and in adults, and has obtained exactly the same results, as with calomel. He has equally employed it in croup and diseases of the liver, and he has not observed any difference of effect between the proto-combinations of chlorine and bromine with mercury.

The deuto-bromide has a metallic and astringent taste, it fuses and sublimes, is less soluble in water than corrosive sublimate; boiling water dissolves a fourth or fifth, but by cooling the greater portion is deposited. It is insoluble in alcohol, but dissolves in ether.

Given internally, in doses of $\frac{1}{4}$ or $\frac{1}{2}$ of a grain in solution, it produces at the end of half an hour, a slight disagreeable sensation, or sort of pressure; after an hour tenesmus came on. The dose of a grain provoked four soft stools, accompanied by colicky pains, and an abundant secretion of urine. A grain and half produced nausea, great flow of saliva into the mouth, some vomiting, and repeated emissions of urine, otherwise no remarkable phenomena.

Administered in recent syphilis, the deuto-bromide is found to produce effects exactly similar to those of equal doses of corrosive sublimate.

On the Physiological Effects of the Salts of Quinine and Cinchonine. By D. L. Berandi.—A young man aged 23 years, of a nervous sanguine temperament, took, fasting, at nine o'clock in the morning, twenty grains of sulphate of quinine dissolved in distilled water. He immediately complained of great bitterness in the mouth, and constriction of the pharynx, with an undefinable sentiment of oppression in the epigastrium. Half an hour afterwards, he had a sensation of weight in the forehead, redness of the face, frequent respiration, the tongue red at the borders, and tinnitus aurium; in one minute the pulse rose from 78 to 95; at ten o'clock, severe headach, pupils contracted, tongue red, heat and pain in the abdomen, pulse 105; by degrees these symptoms abated, and at $11\frac{1}{2}$ o'clock he was perfectly restored.

M. Berandi took twenty grains of sulphate of quinine; the same train of symptoms set in, with the addition of severe diarrhœa, which ceased the following day.

The effects of cinchonine, and its salts, were very similar to those

above related. From his experiments, M. Berandi concludes, that the preparations of cinchonine are all stimulant and irritative; they excite the vitality of all the living tissues, and thus augment the powers of the animal economy.

Internal Effects of Iodine. By M. Lugol.—The internal use of iodine frequently produces particular effects; one of the most important noticed at St. Louis was the increase of appetite in the patients to such an extent that the hospital allowance of food was scarcely or not at all sufficient. This is certainly one of the best effects of iodine, for not only does it indicate an improved state of the digestive organs, but it enables us with ease to invigorate the general constitution by wholesome nourishment, which is particularly valuable in scrofulous patients, in whom very frequently the appetite is almost entirely deficient.

This ordinary effect of the ioduretted preparations on the animal economy sufficiently denotes the numerous applications which may be made of them in the treatment of other diseases, here unnecessary to enumerate, but in which the digestive organs require to be excited.

Iodine is a powerful diuretic. All the patients using it have informed me that they pass urine copiously; and I have known this secretion to be so much increased with many that they were obliged to rise once, twice, thrice, or oftener, by night, than was their usual custom; some have even experienced this diuretic action of the ioduretted mineral water in so instantaneous a manner that iodine was detected in their urine almost immediately after the dose was taken.

More than one-third of the patients who used it have experienced a purgative effect also, and in this respect there prevailed much diversity, from mere freedom of the alvine evacuation, to six or seven stools daily.

This purgative action of iodine, when kept up to a certain degree, prevented my increasing the dose without much caution; but it never caused me to suspend the internal employment of the remedy, except for intervals of two or three days, as I did with the ointment, when it smarted two powerfully.

Iodine has also produced, in several instances, remarkable salivation. I have seldom observed that effect but in *male* patients. It was especially remarkable in Poiré (see Case X.), who was salivated most profusely in the morning after drinking the mineral water. The ioduretted frictions also operated remarkably in this case.

Several patients, the females especially, have complained of pain in the stomach. I have always stopped this uneasy symptom with the kina wine, of which the patients took two or three ounces after their mineral water. On this point, M. Coindet's experience anticipated mine; and my observations, on the other hand, have verified those of that excellent practitioner, on the efficacy of kina in appeasing the cardialgic affections sometimes produced in certain individuals by the use of iodine.—*On Scrophula.*

Useful Astringent in Cases of Mercurial Salivation.—M. Virey lately mentioned at a meeting of the Society of Pharmacy, that in cases of mercurial treatment, where all the ordinary astringents were found of no avail, it was customary in the United States to use a decoction of the bark of sumach. (*Rhus Glabrum.*) Care must be taken not to confound any other species of sumach with this, as many of this genus are highly irritating and poisonous.

Use of Holly Leaves in Ague.—M. Magendie made a very favourable report on the use of powder of holly leaves, recommended by Dr. Rousseau as a cure for fever. The reporter stated, that the new remedy had been tried in the hospitals in thirteen different cases of fever. The doses administered were from one to five *gros* per day, and in every case the patients were cured after about twenty days' treatment. The effect of the holly is not so quick as that of the quina and salicine, but it is a sure and excellent febrifuge. The only thing necessary to make it thoroughly useful, was to extract its essential properties, so as to avoid the necessity of administering it in such large quantities. We have already mentioned that this has been done; and M. Majendie concludes his report by stating, that ilicine may now take its place with quina and salicine in the list of febrifuges.

Use of Conium in Cancerous Diseases.—Mr. Williams has used with considerable success, poultices of the leaves of Conium Maculatum in cancer of the breast, as well in the schirrous as in the ulcerative period. The application was continued until the patient became fully under the influence of the plant, as rendered evident by the occurrence of symptoms of narcotism.—*American Journal.*

Corrector of Opium.—According to M. Puchelt, a German physician, the sulphate of soda is an excellent corrector of the unpleasant effects of opium, given in the proportion of a scruple to half a grain of opium. This dose may be repeated two or three times a day. In combination with glauber salt, opium, he says, may be administered in cases where slight plethora, local or general, prevents recourse being had to opium alone: in obstinate hæmorrhages, principally, this mixture will produce the happiest effects. But if sulphate of soda prevents the congestion which opium sometimes produces, there is another article which corrects its narcotic without diminishing its sedative effects, this is the castor. The combination of opium and castor, M. P. considers very useful in cases of hysteria.

Ulceration and Perforation of the Heart.—The subject of this case was a female fifty-one years of age, admitted into the Hôtel Dieu, on the 8th of March last. She exhibited some obscure gastric symptoms, and could very imperfectly describe either the nature or the seat of her complaints; her tongue was pale and slightly furred,

her pulse regular, rather more frequent than natural; bowels inactive. Her disorder appeared so slight, that little attention was paid to her. Eleven days after her admission, she suddenly died. A short time previous she had been tranquilly conversing with her neighbour, and did not make any complaint of pain or unusual uneasiness.

On examination, the left ventricle was found perforated at its posterior and middle part by an ulcer, or apparently two ulcers, one commencing internally, the opposite to it externally; at least the shape of the hole gave that idea, it being larger externally and internally than in the centre. The fleshy substance of the heart was not softened, except for a short distance round the ulcer. Thick, red, fibrous layers were found on both surfaces of the heart, the heart was enlarged, but without any thickening of its parietes. The ventricular valves and orifices of the vessels were normal.

SURGERY.

Removal of Schirrous Tumour of the Neck.—Dr. Stedman of St. Thomas, was consulted by Thomas Sensire, a black, about a large tumour on the right side of the neck and jaw.

The tumour extended from behind the concha of the external ear to one inch below the angle of the jaw bone. Upon the upper part, the tip of the ear and part of the cartilage of the concha were imbedded in the tumour, which extended on the fore part from a little below the malar bone to the upper portion of the thyroid cartilage. It dipped under the jaw bone to the depth of nearly two inches. The greater part was of a stony hardness; but there were two lobes on the top of the tumour which were softer, and over which the skin was thin and of a reddish hue, these in a few days burst into ulceration, giving issue to a thin and fœtid discharge.

The tumour had commenced about twelve years before, at the angle of the jaw, and was at first about the size of a walnut, it had gradually increased, and gave rise to a great deal of pain.

Extirpation of the tumour was determined on, previous to which it was deemed necessary to tie the right common carotid artery to prevent effusion of blood.

The first operation occupied fifty-five minutes, he was then allowed to rest for some time, some cordials were given him, and having been again fixed in a recumbent position, Dr. S. proceeded to extirpate the tumour.

An incision was made from behind the concha of the ear to the termination of the tumour in the neck. The skin was then dissected from the tumour until the operator arrived at its base. An oval in-

cision was then made on the front part of the tumour, extending from the front of the ear to the termination of the first incision. Dr. S. was unable to save as much skin as he at first had wished, from its being tuberculated and of a suspicious appearance. The tumour was then dissected out on this side. Notwithstanding the ligature of the common carotid artery, several arteries sprung in the course of the dissection, so that he had altogether to tie seven in this part of the operation. The tip of the ear and the cartilage above, were now dissected out of the tumour, which was dissected alternately on each side, until it hung by a portion not thicker than the middle finger, deep under the angle of the jaw. Upon attempting to cut out this, a considerable artery jetted out its blood. Two ligatures having been thrown round this part, Dr. S. cut it boldly away, and no hæmorrhage followed. A small lymphatic gland about the size of a bean, being a little hard, was seized by the hook and extirpated. The whole space was then carefully searched, and no diseased portion could be detected. In the course of the dissection a part of the head of the sterno-mastoid muscle was cut away.

The wound that was exhibited after the removal of the tumour, including the one made for tying the carotid artery, extended from the mastoid process to near the sternal extremity of the clavicle, and from the front part of the ear to deep under the jaw, near the angle of the mouth. The lips of the wound from the sternal extremity to the angle, where the two incisions round the tumour met below the jaw, were brought together by the interrupted suture. The upper wound could not be closed by the skin, as a large portion had been cut away; it was therefore covered with adhesive strap. Slips of adhesive plaster were put between the stitches on the wound of the neck, and the whole being covered with a layer of charpie, a loose roller was passed round the neck and over the top of the head.

The second operation lasted about forty-eight minutes, the patient lost about fifteen ounces of blood, the operation was performed on the 7th of September, and on the 6th of October he was dismissed perfectly cured.—*Edin. Med. and Sur. Jour., Jan.* 1832.

Varicocele.—M. Delpech has published five cases of varicocele in the report of the hospitals of the South of France, in order to illustrate his mode of treating this inconvenient malady. He tries to obliterate the spermatic veins, and finds that when he succeeds in so doing, the size of the testes becomes gradually restored, and with it the functions. In the first case, the two dilated veins having been exposed, they were raised separately, under each was placed a bit of thick amadou, and over this each vein was secured by a ligature. The wound was simply dressed; from inflammation of the external coat of some of the veins, an abscess formed in the scrotum, and was opened; on the third day, the amadou and ligatures were removed from the veins, which had become filled by coagulated blood. The patient recovered perfectly, and had many children. In the second

case, the same mode was followed, the disease of the testis was cured, but the patient died of hectic fever, from absorption of pus and purulent deposits in the liver. In the third, with the same treatment, the patient was cured after some trouble, from secondary hæmorrhage.

M. Delpech was now led to imagine, that he might modify the operation with advantage, and in the succeeding case he did modify it accordingly. In the fourth case, an incision an inch in length was made below the inguinal canal, in the direction of the cord; the varicose veins were exposed, seized with the forceps, and separated by the nails from the surrounding parts. A strip of amadou, half an inch in breadth, was then passed under the vessels, and its extremities brought out at the wound, and secured there by adhesive plaster. Thus, there was no ligature upon the veins, which were merely isolated for a small space from the surrounding parts, and left in contact with the amadou. On the fourth day the veins were red externally, manifestly choked by the adhesive inflammation internally, there had been little or no inflammation of the parts around. The amadou was withdrawn. The success of this operation was complete, the cavities of the veins becoming obliterated, the disease cured, and the testis regaining its natural functions.

In the fifth case also, recovery was perfect; it was, however, rendered more complicated by the supervention of peritonitis.

Treatment of Burns.—A man, in attempting to rescue his daughter, whose dress had accidentally caught fire, burned himself considerably. He applied for advice three days after the accident. His wounds had been dressed with a mixture of water, chalk, and oil. He suffered great pain, and there was considerable swelling of both fore arms, and the right leg, which was also injured. Fever had set in. As to the extent of the local injury, both hands, as far as the wrists, were stripped of the epidermis, with the exception of some parts, where this membrane was partly detached, and partly adherent. On the back surface of some of the fingers there were eschars, and excoriations perceptible, which did not penetrate beyond the dermis. At the external and posterior part of the right leg, the skin was destroyed, to the extent of about five inches by three or four. The patient was most anxious to obtain relief, which the means already resorted to had failed to produce. I employed the following treatment:—I covered the wound on the leg with cotton, and kept it there by a bandage loosely applied. I removed the cloths that had been soaked in oil, and applied to the right hand, and replaced them with compresses steeped in water, at the temperature of *Zero*, recommending them to be renewed every ten minutes, for twenty-four or twenty-six hours. To the other hand I continued the application of the oil and chalk liniment. In two hours a very sensible diminution of pain was manifest in the hand to which the freezing water had been applied. In four hours, the heat which always accompanies

swellings of the skin had nearly subsided from the limb of this side; in the other, on the contrary, the same burning pain, the same feeling of tension and difficulty of motion continued, so that, on the following morning, the patient, who had hitherto, much against his inclination, continued to dress his left hand with the liniment, would no longer resist the inclination he felt to apply to it the compresses with cold water, as to the other, and continued this application to both hands for forty-eight hours. At the end of this time the swelling and pain had subsided, and the wounds were dressed with a saturine cerate and lint. On the twenty-eighth day the patient returned to his employment, which was that of a weaver. The wound of the leg, which had required no attention, after the application of the cotton, was found perfectly cicatrized. All that remains of the injury is a slight redness of the skin, which, nevertheless, is as smooth in this part as elsewhere.—*Bulletin Gen. Therapeutique, Oct.* 1831.

Cold Fomentations in Ophthalmia.—Cold fomentations have been used with good effects, at the Hospital de la Charité de Berlin, in scrofulous ophthalmia. It is employed night and morning by means of folded compresses, in which ice is included, and these are frequently renewed. At the end of an hour the eyes are carefully wiped. The immediate effect is a diminution of the redness, and sensibility to light; the symptoms disappear by degrees, and more readily when this treatment is accompanied with an internal exhibition of anti-scrofulous medicines. The following cases are proofs of its efficacy:—

Case 1.—A youth, æt. 15, affected from infancy with scrofulous ophthalmia, had about 3 weeks previous to his entering this hospital, been seized with violent pain in the eyes and the neighbouring parts, accompanied with great redness and sensibility to the light. The cornea of the left eye was ulcerated, and likewise perforated; there was a prolapsus of the iris, and adhesions between this membrane and the cornea. There were perceived a number of enlarged blood-vessels, which run along the border of the transparent cornea. Cold fomentations were immediately applied, without any internal exhibibition. In a few days the eyes easily supported the light, the redness had disappeared, and the opacity of the cornea limited the prolapsus of the iris. To complete the treatment, a few anti-scrofulous powders were given. On the twenty-second day the patient left the hospital, entirely cured.

Case 2.—A youth, æt. 13, whose eyes never had been in a healthy state, entered the hospital about three weeks after ophthalmia had commenced. His body was covered with scrofulous eruptions. The right eye was considerably inflamed; there were numerous blood-vessels perceived, which traversed the lucid cornea. The eye-lids were much enlarged, the Meibomian glands deposited an abundant quantity of mucus. The jugular glands were much swollen; the patient had likewise porrigo. Cold fomentations were used, and

anti-scrofulous and aperient medicines exhibited internally. At the same time a tepid bath was ordered twice a day, and frictions on the nape of the neck, with the unguentum antimoniale. On the third day, the redness and inflammation of the eyes had entirely subsided. The treatment of the porrigo had continued.—*Rust. Magazin. fur. die ges. Heilkunde.*

Tumour of the Upper Jaw.—On the 6th September, Mr. Lafont, Surgeon to the Hôtel-Dieu of Nantes, made a report to the Royal Academy of Medicine of a case where a fibro-cartilaginous tumour of considerable size, weighing 1lb. 9oz., was developed on the alveolar border of the right superior maxillary bone. The upper portion of the jaw was but little tumefied.

The patient, (a girl,) aged 19 years, had had for 12 months severe pain in one of the teeth of the diseased upper jaw; but for the two last years her sufferings have been much less severe.

M. Lafont having cut through the cheek, from the right comissure to the anterior border of the masseter muscle, removed by means of a "*Serpette a lame forte*," a gouge and mallet, all that portion of the right maxillary bone which formed the alveolæ, and the inferior paries of the antrum highmorianum. The operation was completely successful. The academy commended highly the skill and intrepidity of the operator.

Diagnosis of Hydrocele.—On the 27th September, M. Segelas proposed to the Royal Academy of Medicine a method of facilitating the diagnosis of hydrocele. It consists in examining the transparency of the tumour when it is doubtful by means of a tube open at its two extremities. The one is firmly applied to a point of the surface of the tumour while the eye is placed at the other; this tube, by isolating the external luminous rays, permits the eye to appreciate better those refracted by the tumour; it acts here like the tube of a telescope.

Immobility of the Jaw, and Taliacotian Operation.—Mary Park of Massachusetts, æt. 17. In the autumn of 1822 she had an attack of typhus fever: the symptoms were mild, and nothing unusual occurred until the middle of the third week, when tumefaction and redness were discovered on the left cheek, accompanied with slight delirium and general aggravation of fever.

At the end of the third week, a dark vesicle, about the size of a pea, appeared at the angle of the mouth, announcing the existence of sphacelus, and in a few days extended to about two inches in diameter upon the side of the face. A crisis of fever now supervened, which was followed by sloughing of the whole gangrenous portion, leaving the teeth and gums exposed. Upon its cicatrization the jaws remained immoveably fixed, being apparently tied together by a ligamentous band within and about the cicatrix. Her food was introduced into the mouth through a space formed by the removal of a tooth on

the right side. The first set of teeth and the alveolar process of the diseased side were detached by caries. Most of the second teeth were developed in a few years afterwards.

No mercury was used in the treatment of the fever. Her general health is now very good. Her countenance is much disfigured.

She was seen by Dr. Valentine Mott of New York, on the 7th April, 1831, who, as the only means of permanently overcoming the closure of the jaw was the removal of the cicatrix, determined upon excising and replacing it by sound integuments from the face and neck.

"On the following day the operation was performed. It was commenced by carrying an incision from a little within the upper angle of the mouth, around the outer margin of the cicatrix, to a little within the lower angle of the under lip, and by the immediate removal of the newly formed parts included within it. The adhesions between the jaws were next divided, which enabled me, in consequence of the relaxations thus produced, to insinuate between the teeth of the opposite side the point of the lever used in my former cases, with which I finally succeeded in opening the mouth. This point established, the lips were brought together at the angle of the mouth by a suture, and I proceeded to detach a portion of the integuments sufficiently large and of corresponding shape to replace the part removed. It was turned into the space it was intended to fill, leaving a tongue three quarters of an inch in breadth connected with the adjacent part, and sufficient for all the purposes of circulation. The cut edges were adjusted with extreme accuracy, by means of interrupted sutures and adhesive straps; the lower wound was contracted as much as possible by adhesive plasters, and the whole covered with lint compress and bandage."

After the operation every thing went on well. On the 15th she had an attack of rheumatism, which was cured by cochicum; and on May the 14th she returned home perfectly recovered, the jaw quite moveable, and nearly free from any trace of the operation.—*American Journal of the Medical Sciences, Nov.* 1831.

Varix and Dilatation of Vascular Tissue. By Mr. Wright.—A middle-aged woman, long resident in the Baltimore Alms-house, and subject to epileptic attacks, presented the following abnormal developments in part of the vascular system. On the right half of the frontal bone appeared four distinct tumours, or prominences, of a soft, compressible character, and made up apparently of numerous cysts or cells communicating with each other, and thus composing one large pouch or sac, irregularly defined in its base, and lobulated on the surface. One great sac, larger than the rest, was placed near the outer angle of the eye; another occupied the midspace of the superciliary ridge, overhanging and continued upon the upper eyelid, a third stood on the top of the os frontis near the angle of junction with the right parietal, and a fourth was directly over the line of union of the internal angular processes of the os frontis, where they receive the ossa nasi, overlaying the latter bones, and deriving its covering in part from

the skin of the nose. All those tumours, or pouches more properly, pulsated strongly in correspondence with the stroke at the wrist, and could all be flattened or emptied by pressure with the fingers.* The coverings of those pouches, the common skin of the parts, was thin and delicate, apparently much attenuated and weakened by distension. Besides the greater sacs already described, numerous small risings, size of large peas or beans, were dispersed over the temporal portion of the right frontal and parietal bones, and a few of the same kind before and behind the ear. These smaller tumours also kept time with the general pulse of circulation.

The state of the arteries on the opposite sides of the neck and head, in this case was very palpably different. Those of the left side, the common carotid and temporal, &c. felt nearly as they are found under ordinary circumstances; there was, however, some departure, both in the size and action of those vessels, from a strictly natural or common state. Their volume was more developed to the touch, their action sharper, with a very perceptible thrill or jar in the stroke, of the kind denominated aneurismatic. It was in the arteries of the right side of the neck and head, however, that all those characters of faulty state and action were strongly displayed. The common carotid was here very sensibly enlarged; its undue size and overaction palpably evident, not only to the touch, but to the sight; its action uncontrolled by pressure, and the current through it attended by a thrill so bold and distinct as to impart an unpleasant grating sensation to the fingers. This peculiarity of movement became greater as the vessel was traced towards its root, and was particularly strong in the innominata. The dilatation of the common trunk of the artery was participated by all the branches of the external carotid. The occipital, in its tract along the base of the skull, was plainly visible in form and action, and felt scarcely less in size than the little finger. This vessel, as well as the front and middle branches of the temporal, gave distinctly the thrill so remarkable in the common carotid. The general circulation in this case was every where more vivid, marked by a higher tone of action in the heart and arteries, than is common in the female habit.

The patient's report respecting the duration of the tumours about the head, dated them back about three years; for which period also she had been subject to epileptic paroxysms. The latter had been renewed from that time at monthly intervals, more or less regular. Whether the fits of epilepsy anticipated, in point of time, the swellings on the head, was not clearly discriminated in her own recollection; she thought they had occurred much about the same time, but inclined to the opinion that she had suffered one or two attacks of epilepsy before the swellings on the head was observed. She repre-

* The cysts could be depressed by the point of the fingers until something like incavation of the bone was perceived, represented by a hard, rough margin, corresponding to the outline or base edge of the tumours.

sented herself to have been much subject to headach prior to occurrence of fits, or the local affection, and still suffered greatly from frequent and violent pain of the head. She complained likewise of almost constant annoyance, particularly of late, by a sense of fullness, with a peculiar irritation in the membranes of the nostrils and palate.

In July, 1830, the patient was attacked by what at first seemed one of her usual severe head-aches, followed by epileptic invasion, but which, instead of passing off as before, by slow revival of consciousness, &c., glided into a train of symptoms resembling profound encephalitis. She became delirious for a time, soon lethargic, and fell into deep stupor, ending in death, after twelve hours duration, third day after seizure.

For the purpose of tracing the vessels, and for preservation of the parts, as a morbid specimen, it was determined to fill the arteries of the head with the common injection. A pipe was fixed in the root of the aorta, the descending trunk and the subclavians closed by ligature, and the injection passed, until from the quantity thrown up, and the distended state of the superficial vessels, the arterial system of the head was supposed to be fully injected. Although the branches of the temporal artery were filled in all its ramifications, the main purpose of the injection had wholly failed; not a particle of the injection had entered the sacs on the head, with which the artery appeared to communicate freely during life, imparting the fullness and pulsation they then possessed.* A few only of the smaller cysts in the tract of the middle temporal branch were raised up to the knotted form in which they appeared before death. The large pouches at the angle of the eye, on the orbital ridge, the top of the os frontis, and over the naso-frontal junction, were flat and empty. The total failure by the injection could only be explained on the presumption, either that the communication of the temporal branches with the cysts on the forehead had been by very small channels, which became obstructed by coagula after death, or else that the great pouches had not received their fullness and pulsation directly from the temporal branches, as was supposed. The latter conclusion appeared most probable, and at the same time pointed to the *veins* as the rout of communication with the now empty cysts. This conjecture was realized on trial. When a pipe was fixed in the superficial cervical, the trunk of the facial or angular, in the neck, and the injection pushed on, in a moment every sac was swelled out to the size and shape presented in life. All the cysts were filled, the pristine form accurately developed, and the external resemblance to the living state completely restored. The whole character of the local affection now

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* It ought to have been mentioned, in describing the cysts, that deep and strong pressure on the right carotid constantly subdued the pulsation in them, to a great degree, and when the pressure was forcible enough to shut the artery in the neck, it extinguished all movement in the sacs, though they still remained full.

appeared to be changed, instead of a specimen of arterial varix, or anastomotic aneurism, for one of which, (or rather a compound of both,) the case had passed with all examiners, injection appeared to have revealed an example of morbid dilatation in the venous system, anomalous by the fact of immense varicose development in the capillary series, the venous radicles of that system. It proved afterwards that the case was of complicate character; and that while the more prominent forms of vascular tumour were really in a part of the venous capillaries, the arterial series of the head had participated largely in the process, both of general and special dilatation. Definite arterial enlargement, (varix,) was as plainly marked, and scarcely less matured, in parts of the carotid distribution, as the venous varices just described. Arterial and venous developments were equiponderant.

The tumours on the forehead as now re-formed by the matter of injection, were about the size of walnuts, and appeared to be made up by dilatation and anastomosis of the deepest subcutaneous veins; for above each tumour was spread a dense plexus of small veins, finely injected, and overlaying the tumours as a vascular arch or web. The large tumours were closely applied to the cranium, and so firmly attached in their place as to seem imbedded in the bone within the area of their base. In some of them this was found to be the fact: by pushing a common pin obliquely through the margin of the tumours, it penetrated the outer table of the cranium with great ease—the resistance by the bone not exceeding that of a piece of dried bladder; parts of the cyst containing the wax were evidently inserted into the cranium as deep as the middle structure, lattice-work, of the skull. The rough and incavated feel of the bone within the limits of those tumours, which was discriminated by pressure during life, was thus explained.

The arteries of the opposite sides of the head were in a very different state. Those of the neck were enlarged on both sides, but the common trunk of the right much more voluminous than its fellow of the left.* The most palpable inequality of size, however, in the two sets of vessels, was found in the branches of the external carotids. The right superior thyroid was as large as a crow-quill, and though the sublingual and facial were under natural size, the occipital again rather exceeded the ordinary volume of the common carotid. The temporal was more than twice the size of the same vessel on the left side, and the branches of the former exceeded those of the latter, in the same ratio, (twofold,) both in number and size; the whole right side of the head, in fact, was overspread by a coarse web of large tortuous vessels, connected by frequent anastomoses. In only one point on the surface of the head did the present state of the arteries

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* The right carotid, one inch above the innominata, measured one inch and five-eighths in circumference; the left, at the same point in the neck, one inch and one eighth.

realize the idea which had been formed of their condition during life. About the middle of the posterior temporal branch, was a tumour or knob, the size of a small marble, formed by the abrupt dilatation of the lumen of the artery, now filled up and defined by the matter of injection. This was a solitary exhibition of true arterial varix in the set of arteries which had been supposed to betray numerous and large varicose developments. The actual state, then, of the external arteries of the right side of the head was nearly universal dilatation, but that change general and equal, (proportionate,) every where, with one point only of extra or special enlargement.

It appeared probable that the process of dilatation was not confined to the external arteries of the right half of the head. When, by removing the globes from the orbits, the ophthalmics came into view, the relative difference of size was as remarkable in them as in the superficial vessels of the two sides: the right ophthalmic was more than twice as large as the left. On examination of the vessels within the head, it was found that the morbid development was proportionally much greater in the cerebral arteries than in those of the cranium. Both the carotid and vertebral members of the great basilar circle were astonishingly enlarged. The communicans of the right side was equal to an ordinary little finger, and bulbous in three places; a knob near the carotid root of this trunk was as large as a musket-ball. The basilaris was rather more than an inch in circumference, and the right vertebral, immediately on rising up to meet its fellow, swelled out into a pouch, which, filled by the injection, was larger than any other of the tumours or knobs in the basilar series. The left communicans was enlarged, but much less so than the right, and it also exhibited points of particular or definite increment of the saccular form. Thus the arteries of the basis cerebri, besides being generally increased in size, were also eminently varicose at many points: the whole circle, and its principal branches, were singularly tortuous, anastomotic, and knotted.

The condition of the arteries of the brain confirmed the surmise about their state, which, during the life of the patient, had been urged against the probability of benefit by operating on the right carotid. The extent and relations of the vascular dilatations within the head, rendered it plain, that the morbid excitement, or congestions to which they were instrumental, were unsusceptible of counteraction by any means short of total interception of all the channels by the neck. Both the carotid and vertebral members of the basilar circle were dilated and varicose, and every where accessible to the current coming in at any point of the circuit. Whether the relative greater advance in change of capacity in the arteries within the head, than in those of the external carotid system, is to be taken as proof of prior departure from the normal state by the former, can only be conjectural: neither would the settlement of that question determine whether the epileptic state of the patient was the cause or the consequence of degeneration in either set of vessels. The time of origin of such change in the cerebral arteries would remain indeterminate, and the patient herself

never was able to realize whether the fits preceded the tumours on the head, or followed their appearance: she supposed them to have taken place much about the same time.

The tone of vascular action in this case had been found habitually above the par of natural excitement. The pulse was always sharper, harder, and more frequent than is common in health; there was also a perceptible thrill of the aneurismatic kind to be felt in all the principal trunks, even of the limbs. The entonic character of action had become constitutional, and was participated by the vascular series every where, and that habit, the usual forerunner of change of capacity, was marked by its common results. The action of dilatation was traceable in most of the greater channels of distribution; but it was in the right carotid, and its branches, that superaction and dilatation were prominently displayed. For this speciality of morbid action and change it is difficult to find an explanation. Enlargement was regular, uniform, and proportionate through the series, from the root in the innominata to the terminal branches, yet the arterial tissue seemed every where natural—no form of disease or decay in the texture of the coats.—*American Journal.*

Treatment of Un-united Fracture by the Seton.—Dr. Mott has treated eleven cases of un-united fracture by this remedy; of these, three were of the os femoris, three of the tibia, and five of the humerus. In all it succeeded perfectly, except in three of the last mentioned, and which were afterwards cured by sawing off the ends of the bones.—*American Journal.*

Needle swallowed forming Nucleus for Calculus. By Mr. Logan.—" On the 29th January, 1830, Anne Wilson, aged 22, a servant girl, of a robust habit and good constitution, residing in the village of Kilcadzow, three miles north of Lanark, having gone to bed, with a large worsted-needle in her mouth, swallowed it during her sleep; next day she had pain in the hypogastric region, when recollecting to have had the needle in her mouth when she went to bed, and as she could no where find it, she attributed the pain to its presence in her stomach. Three days afterwards it had passed the pyloric orifice, and gained the small intestines, in which situation it seemed to have remained for a length of time, as in May succeeding, when she first consulted me, she complained of permanent pain, a little below the umbilicus on the left side; there was at this time no vesicular irritation, and she menstruated regularly, until within two periods of the extraction of the needle. I did not again see her till January, 1831, but in the previous autumn she had complained of great pain in the situation of the bladder, accompanied with frequent calls to micturition, and passed a stone the size of a horse-bean. In January, 1831, the family attendant, Mr. Bouglas of Carluke, sent her to me, desiring an opinion. By careful examination, I found, that the point of the needle entered at the fundus of the bladder, on the left side, and being pushed on, had perforated the parietes of the opposite side, over the

right acetabulum. The needle had formed a nucleus for the attachment of a calculus, of considerable size, of a lobulated form, and having its larger extremity towards the orifice of the urethra. At this time, she could not retain her urine above two or three minutes, which was passed with excessive pain, and was deeply tinged with blood, coagulating when cold. Introducing a pair of strong dressing forceps, I grasped the needle by a part free from any calculous incrustation, close to the mucous coat on the right side, and endeavoured, by pushing the whole backwards, to free the point, and bring it into the urethra; but this could not be effected by all the force which it was prudent to exert, on account of the long irritation having thickened the coats of the bladder, and produced such a diminution of its capacity, as to grasp the calculus on all sides. Had this succeeded, the calculus might have been crushed, and the whole expelled without incision.

Being foiled in this attempt, we determined on cutting into the bladder, through the urethra. Eight leeches were applied over the pubis, and a gentle saline purgative administered. On the following day, the patient being secured in the usual manner, with the assistance of Mr. Bouglas, I passed a director into the bladder, previously injected, along which a slightly curved bistoury was run, making a lateral incision upwards, towards the left ascending ramus of the pubis. The finger of my right hand was then introduced, and, pushing gently but firmly upon the calculus, the point of the needle was disengaged by the left hand, and brought into the opening; the forceps were then applied, but owing to the size of the calculus, it could not be extracted without enlarging the wound, which must have endangered the establishment of permanent incontinence of urine. The calculus being of a friable nature, was crushed by the forceps, the needle withdrawn, and the fragments brought away by the scoop. The bladder was then washed out, an elastic gum catheter introduced, and the patient put to bed. In the evening, twelve ounces of blood were taken from the arm, and leeches applied on the accession of any inflammatory symptoms. The bowels were kept open and occasionally glysters administered, accompanied by warm fomentations. The wound suppurated on the 8th day. On the 22nd day she was able to sit by the fire and move about a little; she can now retain her urine two hours, and passes it by a voluntary inclination, offering a good prospect that there will be no permanent incontinence."—*Johnston's Journal, Jan.* 1832.

LEGAL MEDICINE AND TOXICOLOGY.

On the Disinfecting Power of increased Temperature, as a Substitute for Quarentine.—Dr. Henry has recently made some interesting experiments on this subject. Their object was to acertain

whether the infecting power of certain articles of clothing could be destroyed by heat, and secondly, whether the heat necessary to be used, would not be injurious to the article. He found that exposure to a temperature of 190° Fah., materially injured the tenacity of cotton by the resulting desiccation, but that after lying for a few days, the cotton had recovered perfectly its hygrometric moisture, and with it had regained its original tenacity; this occurred as well with the raw material, as with cotton spun into yarn.

Articles of silk, wool, &c., even of the most fugitive colours and most delicate textures, were found not to be injured by exposure during three hours, to a temperature of 180°, if they were then left for some hours in a room without a fire; neither were furs or feathers altered.

The next important point to be ascertained, was, whether this temperature was capable of destroying the infective power of these substances *(fomites.)*

As the contagious matter of plague, typhus, &c. could not be obtained, the experiments were made with the vaccine matter, which, in every instance, lost its inoculating power by being heated to any temperature above 140° Fah. Dr. Henry hence infers, that probably the analogous though less tangible noxious matter of typhus, plague, &c. may be destroyed by a similar elevation of temperature, and describes an apparatus, by means of which it could be performed on a large scale. If successful, it would be decidedly a mode of preventing the importation of disease, much less detrimental to the commercial interests of a nation, than the establishment of quarantine.

Dr. H., afterwards, was enabled to ascertain by experiment, how far the contagious matter of typhus and of scarlatina may be rendered powerless by increased temperature. Flannel waistcoats which had been worn for several hours by a patient affected with fever, that terminated fatally on the fourteenth day, were subjected to the action of temperature of 204° or 205° Fah. for an hour and three quarters, and one then kept beneath and within twelve inches from the nostrils of a person engaged in writing during two hours: another was worn next the body of the same individual for two hours, and the third having been kept in an air-tight cannister for twenty-six days, in order to give activity to any contagious matter which might have escaped decomposition, was placed within twelve inches of the face of the same person for four hours, a gentle current of air being contrived to blow upon him from the flannel during the whole time. No injurious effects were experienced.

Similar experiments were made with garments impregnated with the infectious matter of scarlatina; but after having been submitted to the agency of an increased temperature, they were found quite unable to re-produce the characteristic disease.

Poisoning by Goose-Grease.—On the 2nd of April, Dr. Siedler was called to attend MM. H——, and their children. On his arri-

val he found the two brothers H——, one aged thirty-one, the second twenty-eight years, and the two children of the first, one a girl æt. four, the other a boy æt. two and a half, all presenting the following symptoms,—cold sweat, anxiety, vertigo, general paleness and prostration of strength, eyes sunken, and pupils dilated; burning pain was felt in the lower part of the belly, increased by pressure; violent vomiting succeeded by ardent thirst, for which the patients had drunk large quantities of milk, which was thrown up without producing any effect; tongue dry, involuntary discharge of urine and fæces.

The eldest brother was insensible for six minutes; his respiration was scarcely visible, his pulse imperceptible, and the heart's action exceedingly weak. The second brother had vomited blood several times, but he experienced less abdominal pain than the other. In the little boy the globes of the eyes were turned upwards, the lips livid, and the pulse scarcely sensible. Lastly, the symptoms in the little girl were the mildest of all. M. Siedler suspected at once that these accidents were occasioned by the use of a certain quantity of goose-grease, which had been employed in the preparation of some meat, of which the four patients had eaten shortly before the symptoms began. An emulsion, containing hyoscyamus, was prescribed, and on the 9th of April all had recovered.

The vomited matters were subjected to chemical analysis; they were strongly acid, but contained no metallic poison: but the following facts induced Dr. Siedler to attribute the illness to the effect of sebacic acid. The lady of the house had made use of goose-grease to dress some veal, and all the persons who partook of the dish fell quickly sick. The lady herself, who had barely tasted it, felt it so disagreeble, that she took no more. None of the grease which was suspected to have caused the accident remained for examination, the pot which contained it having been entirely emptied and cleaned out; but on examining the same kind of grease contained in three other pots, it was found to exhale a strong repulsive odour, and it reddened strongly paper tinged blue by turnsole. Three ounces of this grease were given to a vigorous, well-formed dog: an hour after, his extremities became violently convulsed; he cried piteously, he refused to eat, his eyes were suffused, pupils dilated, skin cold, and arterial pulsations scarcely perceptible. In this state he continued for thirty hours, after which he slowly recovered.—*Journal of the Royal Institution, No. V., Dec.* 18.

Effect of Opium on Longevity.—In consequence of a recent medico-legal investigation, Professor Christison has been induced to examine whether this narcotic, when habitually used, has a tendency to abridge the term of human life. There are not as yet a sufficient number of facts on record to warrant a conclusion, but as far as Dr. Christison's researches go, they prove that in many cases, persons who diurnally swallow enormous quantities of this poison, may yet live to a considerable age. Dr. C. however does not consider the conclusion that opium does not injure longevity, as warrranted by facts; he says these cases resemble those in which habitual drunkards have lived to

a great age, and thinks it probable that this habit, although less fatal than is considered by the common people, will be found not less inimical to health than the constant use of ardent spirits.

MATERIA MEDICA AND PHARMACY.

New kind of Musk.—At the last meeting of the German Physicians and Naturalists at Heidelberg, M. Jobst exhibited an entire skin furnished with the musk bag of a musk animal of Mongolia. The animal to which the skin belonged appears to constitute a new species, which is characterized by two white stripes along the neck, and which M. Eschschotz names *Moschus Altaïcus*. The musk which it contained was of a very good quality. The orifice which is seen in the bags is natural, and is not made for any fraudulent purpose, as was formerly supposed.

Use of the Persesqui-Nitrate of Iron.—Mr. Kerr proposes a ferreous preparation having the above name, for the cure of diarrhœa, epilepsy, malignant cholera, &c.; he prepares it by dissolving $7\frac{1}{2}$oz. of iron wire in 3oz. nitric acid, 27oz. water, and 1 drachm of muriatic acid. The resulting compound differs from both the per and proto-nitrates of iron, and if by any alteration in the process these salts are formed, the virtues of the preparation are lost. These virtues he conceives to be that of "uniting to an astringent power, the property of diminishing the irritability and tenderness of the mucous membrane with which it comes in contact."—*Edinburgh Journal, January*, 1832.

Preparation of Burned Sponge.—M. Guibourt has examined which of the four methods of preparing sponge for medicinal uses, is to be preferred.

1. Sponge fully calcined, as directed by the old Codex Medicamentarius.

2. Sponge torrefied so as to become black and friable, as ordered by the London and Dublin Pharmacopœias, and recommended by Pleugue and Foderé.

3. Sponge scarcely torrefied, and yielding a straw yellow powder, as proposed by Chereau, and

4. Sponge in its natural state, as used by Herrenschwand.

He found that in the first preparation, where the sponge was calcined, the whole of the iodine was expelled, and the residue contained much alkaline sulphurets, and cyanurets.

In the last, the sponge gives out to boiling water but a portion of its iodine: the greater quantity remains insoluble.

That the same objection applies to Chereau's mode, but with less force, and finally

That the mode of torrefying the sponge until it becomes black and friable, is that which confers upon it the greatest medicinal activity, and consequently the mode of preparation which ought to be universally followed.

Preparations of Iron.—M. Bernal has communicated several improved processes for preparing these important substances; we shall extract those which are also officinal with us.

1. Per-chloride of Iron.

℞ Per-oxide of Iron	- - - -	5 Ounces
Muriatic Acid	- - - - -	19
Total	- - - -	24

Mix in a platinum capsule, and boil for ten minutes to dissolve the oxide, then concentrate the solution to fifteen ounces, by the heat of a water bath, and filter.

This solution is reddish brown, when diluted with much water it is yellow if neuter, but nearly colourless if the acid be in excess.

2. Acetate of Per-oxide of Iron.

℞ Concentrated Acetic Acid	- -	16 Ounces
Recently prepared Per-oxide of Iron	-	8

Warm the acid in a platina dish, and saturate it with the oxide, taking care to use an excess of the latter; let it cool and filter.

This solution is bright red, always acid, and unaffected by exposure to the air.

3. Tincture of Acetate of Iron.

℞ Dilute Alcohol	- - - -	14 Ounces
Acetate of Per-oxide of Iron	- -	2
		16

Mix, leave aside for forty-eight hours, and filter.

This preparation is wine red, acid, and unalterable by the air.

4. Tartrate of Potash and Iron.

℞ Bi-tartrate of Potash in powder	- -	8 Ounces
Distilled Water	- . - -	24
Recently prepared Per-oxide of Iron	-	9 S.

Mix the water and cream of tartar in a platina capsule, and heat the mixture to boiling: then add as much moist per-oxide of iron as the liquid can dissolve: saturate with a sufficient quantity of solution of potash: filter and concentrate so as to obtain twenty ounces of solution.

N. B. To obtain this preparation in a solid state, the solution is to be very cautiously evaporated to dryness in porcelain vessels.

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PART I.

ORIGINAL COMMUNICATIONS.

Art. IX.—*Cases of Aneurism.* By James W. Cusack, Esq., M. R. I. A., one of the Surgeons to Dr. Stevens's Hospital, Surgeon to St. Patrick's Lunatic Asylum, &c. &c. Reported by W. W. Campbell, M. R. I. A., Member of the Royal College of Surgeons in Ireland, and formerly Clinical Clerk to Dr. Stevens's Hospital.

Although the cases of aneurism detailed in the following report, may appear to those surgeons, whose extensive practice and connexion with hospitals afford them frequent opportunities of observing the varieties of that disease, to possess but little novelty, yet it is hoped, they will be perused with some degree of interest by less experienced practitioners, for whom this report is chiefly intended.

Four forms of aneurism may arise in the bend of the arm from a wound of the brachial artery (sometimes the radial) in venæsection, aneurismal varix, varicose aneurism, diffused and

circumscribed false aneurism. Respecting the treatment of the two last, considerable difference of opinion exists among practical surgeons, some contend that both require operation, whilst others maintain their curability by compression.

The advocates for the operation have not as yet decided upon the precise situation where the vessel should be secured, nor upon the mode of securing it, some apply a ligature upon the vessel above the aneurism, and depend upon the absorbents for the removal of the tumour, whilst others open the aneurism and tie the artery above and below the wound.

The supporters of the mode by compression have not agreed either upon the place where the compressing force should be applied, nor upon its degree; some direct violent pressure to be made upon the vessel above the aneurism to obliterate its canal, whilst others are content to apply very slight pressure to the tumour itself.

In the midst of such conflicting opinions, we must appeal to facts, before we can arrive at any thing like a satisfactory conclusion.

Case I.—John Miley, ætatis 27, applied to Dr. Stevens's Hospital, and was admitted on the 11th October, 1828, with a circumscribed false aneurism of the brachial artery in the bend of the arm, produced by puncture in venæsection. *He stated, that thirteen days previously,* in order to procure relief from a cough which he laboured under, *he permitted a blacksmith to abstract blood from his arm;* during the operation, he was struck with the florid red colour of the blood, and the distance to which it was propelled; also, the difficulty experienced in suppressing the hemorrhage, this was at length accomplished by means of a compress and bandage very tightly applied. On the following day, the arm felt stiff, and he had the bandage loosed, but continued to wear it for several days. On its removal, he observed the "beating tumour" in the arm, became alarmed, and applied to the hospital for relief.

On inspection, a firm pulsatory tumour, about the size and

shape of a pigeon's egg, was detected in the bend of the arm, along the course of the brachial artery, with which vessel it appeared intimately connected. It became smaller when compressed, but resumed its original size when the pressure was removed. The radial pulse on that side did not beat so fully as on the sound side. The integuments were perfectly healthy, and presented a small cicatrix, such as might be expected after venæsection.

The only vein which could be detected in the neighbourhood of the tumour, was the median basilic, it ran in front nearly an inch internal to the cicatrix, and obviously had not been opened in the operation.

This case being evidently one of circumscribed false aneurism, not complicated with wound of the vein, and unattended with inflammation, was considered favourable for the trial of compression.

The patient was immediately confined to bed, the limb placed upon a pillow, some cathartic mixture prescribed, and sixteen ounces of blood abstracted from the opposite arm.

The next day, a thin compress of wetted lint was laid upon the aneurism, and a roller bandage applied from the fingers to the bend of the arm, in the manner recommended by Genga, care being taken that the compression should not extend above the aneurism, the turns of the bandage over the aneurism were very loosely applied. The patient was desired to keep the compress constantly moistened with cold water, and to take a draught containing two drops of tincture of digitalis every sixth hour.

Two days subsequently, the bandage was opened and reapplied, the draught was continued, and he had sixteen ounces of blood taken from the opposite limb.

On the 7th day, the aneurism felt more solid, and did not diminish so sensibly when compressed. The bandage was reapplied, and a compress of sponge substituted for the lint. The digitalis continued, and other treatment as before.

On the 12th day, the aneurism appeared sensibly diminished, and much more solid; the pulsation in it was less distinct, whilst that at the wrist appeared more full. Bandage continued; the turns which passed over the compress being applied more firmly than before. Pulse 66. Patient is in perfect health, but complains much of the strict antiphlogistic regimen which he is compelled to observe. He was ordered to take a draught, containing thirty drops of tincture of digitalis, every second hour.

In the evening his pulse was down to 38. He did not complain of nausea or giddiness. The draughts were discontinued.

On the 14th day, the digitalis was administered in doses of twenty drops every sixth hour.

On the 20th day, the tumour was not larger than a marble, perfectly hard and without pulsation. The radical pulse beat firmly, and nearly as full as on the opposite limb. The bandage was reapplied, the compressing force being increased. Digitalis omitted. Antiphlogistic treatment still persevered in.

On the 30th day, there was no trace of the aneurism; the brachial artery could be felt pulsating strongly beneath the cicatrix in the integument, and the radial pulse appeared as full as that of the opposite limb.

On examining the patient eighteen months subsequent to his dismissal from the Hospital, no trace of the aneurism could be detected, the artery pulsated beneath the cicatrix strongly; the pulse at the wrist felt perfectly natural, and he stated, that he had not suffered the slightest inconvenience from the arm, in pursuing his very laborious occupation.

Case II.—Terence M'Evoy, ætatis 25, a countryman, was admitted into Dr. Stevens's Hospital, on the 2nd of March, 1829, on account of a circumscribed false aneurism in the bend of the arm, from puncture of the brachial artery in venæsection.

He stated that he had himself blooded in the left arm nine months previously, in order to be freed from an obstinate pain

in his side. The blood flowed with impetuosity, and per saltum, and the operator had considerable difficulty in stopping it. Three days after, this man observed, on removing the bandage, that he had a small pulsating tumour at the place where he had been bled, which was painful, and prevented him from bending or extending his arm freely. He endeavoured to follow his usual labour, (being a flax breaker,) but after a day or two was obliged to give it up, in consequence of the tumour becoming large and painful; after three or four weeks' rest, the pain ceased, the tumour remaining unaltered.

On examination, a distinctly circumscribed pulsating tumour, fully as large as a Turkey's egg, was evident in the bend of the arm. Pressure on the brachial artery stopped its pulsation, but did not diminish its size. This tumour was uniformly elastic, except at its anterior part, where it felt soft, and pulsated most strongly. An artery of considerable magnitude ran over its anterior surface, but did not appear to be connected with it. The integuments were perfectly healthy, and an old cicatrix was observable on the centre of the swelling.

As this case differed in no material point from the preceding one, it was decided that it should be treated in a manner exactly similar.

Accordingly, the patient was immediately confined to bed, his arm laid upon a pillow. Strict antiphlogistic regimen was prescribed, and twenty ounces of blood were taken from the opposite arm.

The following day he was ordered to take a draught, containing ten drops of tincture of digitalis, every sixth hour, and the bandage and compress of wetted lint were loosely applied, as in the preceding case.

3rd day. Pulse 51. Bandage removed, and reapplied as before. No change in aneurism. Digitalis continued.

4th day. Complains of uneasiness in tumour, evidently depending upon the tightness of the bandage; also of slight

nausea, and dizziness. Bandage removed, and reapplied more loosely. Digitalis omitted. Pulse as yesterday.

7th day. Bandage removed, and reapplied. Lint compress laid aside, and one of sponge substituted. Digitalis continued as before.

10th day. Pulse 54. Bandage removed, and reapplied. Tumour appeared more defined. Complained of the strict regimen which he was obliged to observe. Digitalis continued.

14th day. Pulse 45. Complained of nausea and giddiness. The arm felt easy. Digitalis omitted.

20th day. Tumour appeared flatter, and less elastic. Bandage reapplied, and digitalis prescribed.

26th day. Pulse 48. Tumour harder, and pulsation less distinct. Bandage reapplied and digitalis continued.

32nd day. Scarcely any pulsation in the aneurism. It appeared diminished in size, but increased in solidity; the folds of the bandage over the tumour more tightly applied. Digitalis continued.

38th day. The aneurism had lost its pulsation; had become quite solid, and appeared much lessened in magnitude. The bandage was reapplied; the compressing force over the tumour being increased. Digitalis discontinued.

On the 50th day, there was no trace of the aneurism, the artery which had been wounded could be felt pulsating strongly beneath the cicatrix at the bend of the arm, and the vessel which ran across the tumonr (the radial) appeared perfectly natural.

Case III.—John Byrne, ætatis 35, a healthy countryman, applied at Dr. Stevens's Hospital on the 25th February, 1830, on account of a circumscribed false aneurism of the brachial artery, produced by wound of that vessel in venæsection, the accident had happened nearly five weeks previously.

An oval shaped pulsating tumour, fully as large as an orange, was situated in the bend of the arm; the long axis of which corresponded with the brachial artery, to which vessel it

adhered intimately. It was perfectly solid at the base, but in the centre felt soft and elastic. The integuments were free from inflammation, and the cicatrix produced by the puncture, was visible on the most prominent part of the tumour.

The median basilic vein ran across the aneurismal tumour, about an inch below the cicatrix, and did not appear to have been wounded in the operation. When the brachial artery was compressed, the aneurism lost its pulsation and became softer.

The success which had attended the treatment adopted in the first two cases, suggested the possibility of removing this by similar means; it deviating from the others solely in being somewhat larger.

He was immediately confined to bed, his arm placed upon a pillow, strict antiphlogistic regimen enforced, and the tincture of digitalis prescribed in doses of ten drops every sixth hour.

On the 4th day, sixteen ounces of blood were taken from the opposite arm, and the bandage and compress applied as in the other cases; the digitalis was continued.

On the 8th day, the tumour appeared more solid, the bandage and compress was re-applied more firmly, and in addition a firm compress was bound along the artery above the swelling. Digitalis continued.

On the following morning, he complained of great pain in the arm, principally referred to the tumour, and stated that he had passed a restless night. On removing the bandage, it became evident, that the aneurism had ceased to be circumscribed, it extended up along the inner edge of the biceps muscle, towards the axilla for several inches. The whole swelling, but particularly the upper part, was soft and fluctuating, and the pulsation throughout was not very distinct. As the case had clearly changed its nature, it became necessary to consider what was the best mode of treating it, it now being a case of diffused false aneurism. In consultation, it was determined to treat it as a wounded artery; accordingly, an incision was made along

the course of the original aneurismal swelling, including the cicatrix, through both skin and fascia. The coagula having been turned out, a gush of florid red blood directed the operator to the artery at the bottom of the cavity; the aperture in the vessel was perfectly circular, and engaged at least half of its diameter. The hemorrhage continuing after the ligature was applied above the wound in the vessel, another was applied below; the hemorrhage instantly ceased; light dressings were applied, and the arm laid upon a pillow. The ligatures were cast off on the 12th day, and on the 30th day he left the hospital quite well.

It is manifest, from the foregoing cases, that the form of aneurism to which pressure is most applicable, and in which it is most likely to effect a cure, is that of circumscribed false aneurism, unattended by inflammation either of the sac or surrounding parts.

It is equally obvious, that the pressure should be applied to the tumour alone, and not to the artery above, and that the degree of pressure be slight until the diminished pulsation and solidity of the tumour indicate that coagula fill the sac, otherwise the aneurism will become diffused, as took place in the third case.

It is probable, if not certain, that the opinion hitherto entertained respecting the obliteration of the artery at the part wounded, is, in the majority of cases, erroneous and without foundation. The pulsation beneath the cicatrix remained strong and natural, after the absorption of the tumour in both cases, and in a case of circumscribed false aneurism in the bend of the arm from bleeding, which Mr. Wilmot cured by pressure several years ago, in Jervis-street Hospital, the artery continues to pulsate strongly beneath the cicatrix to this day.

The utility of combining Valsalva's mode of treating internal aneurisms with gentle pressure on the tumour itself, was well exemplified in these cases.

Art. X.—*Clinical Observations on the Exhibition of Opium in large Doses, in certain Cases of Disease.* By William Stokes, M. D., one of the Physicians to the Meath Hospital, &c.

It may appear unnecessary in the present state of medical science, to bring the importance of opium, as a remedial agent, before the notice of the profession. In these countries, indeed, its value has long been appreciated, and the writings of Drs. Hamilton of Lynn-Regis, and Armstrong of London, have established its value in many cases of inflammatory disease, when it was combined with other remedies. But practitioners do not, as it appears to me, sufficiently estimate the powers of opium, in subduing inflammatory action, and it is principally with a view to establish this point, that the following observations are made.

The first form of disease in which the use of opium appears peculiarly advantageous, may be stated to be that of *Peritonitis occurring under circumstances where blood-letting cannot be employed.* Now, the following are the circumstances under which I have seen this condition of parts to arise:

1st.—Peritonitis arising from the escape of fœcal matters into the peritoneal cavity, through a perforating ulcer of the intestine.

2nd.—Peritonitis arising from the bursting of an abscess into the serous cavity.

3rd.—Peritonitis occurring after the operation of paracentesis in debilitated subjects.

In addition to these cases which I have myself witnessed, we may add, that low typhoid peritonitis, occurring after delivery, as described by Drs. Cusack and Gooch; and the peritonitis which results from rupture of the intestine, induced by external violence.

We can scarcely conceive a more severe and dangerous form of peritonitis, than that arising from the passage of the intesti-

nal contents into the peritoneal cavity. This disease, I believe, was first accurately described by Louis, in his Anatomico-Pathological Researches, under the name of Peritonitis from perforation of the small intestine. In all his cases the disease arose from a recent ulceration of some of the mucous follicles in the last nine or twelve inches of the ileum, which, perforating the mucous membrane on the one side, and the cellular, and serous on the other, caused a direct communication between the intestinal and peritoneal cavities. Of this disease we have seen many examples in the Meath Hospital, in which, with scarcely an exception, we have diagnosticated the lesion previous to death; with but a single exception, the situation of the perforating ulcer was as described by Louis, and the cases in which this accident occurred, were chiefly those of *gastric fever*, idiopathic diarrhœa, and hypercatharsis, from an over dose of purgative medicine; cases, in all of which there exists an excited state of the intestinal mucous glands. In all our cases, we found, besides the perforating ulcer, decided evidence of inflammation in the mucous membrane, and neighbouring follicles, some of which were enlarged and vascular, others softened down and forming ulcers, the basis of which were frequently formed by the serous membrane alone.

The diagnosis in these cases is generally not difficult, being principally founded on two circumstances.

1st.—The sudden supervention of the peritonitis.

2nd.—The rapid sinking of the powers of life.

These circumstances occurring in a case where there were previous indications of a diseased state of the intestinal mucous system, formed the ground of our diagnosis. I need scarcely add, that we owe this to the researches of Louis.

There is here a sudden solution of continuity, and the diagnosis is founded on the same principles as that of other internal ruptures; for example, in cerebral apoplexy, rupture of the heart, or of aortic aneurism, pneumo-thorax from fistula,

rupture of the bladder and uterus. It is true, that some of these accidents may take place without this suddenness of symptoms, so will also the disease under consideration; but these are exceptions to a general rule.

In the Report of the Meath Hospital, published by Dr. Graves and myself, in the fifth volume of the Dublin Hospital Reports, we have mentioned our opinion, that the principles of treatment in these cases, do not appear to have been at all investigated or understood. Indeed, on the first view of this dreadful disease, it appears almost romantic to expect that any treatment can save life. Here is a violent, sudden, and universal peritonitis, brought on, less by the extension of diseased action from one tissue to another, than by the introduction into the sac of a highly irritating fluid; a peritonitis, arising in a person, already the subject of another and severe disease, and constantly kept up by the continual ingress of the fœcal matter from the tube. The disease runs its course in a very short space of time, and though the physician be called early, quoad the time, he is late quoad the disease, or at least the period of it when the usual mode of treatment can be available.

We cannot bleed in these cases, for the powers of life sink almost instantaneously. We cannot use mercury internally, for any thing that excites the peristaltic action of the intestine, will of course tend to keep open the communication, and the external use of mercury is too slow in its action to arrest the disease. The means of treatment, then, in common peritonitis, are unavailable, a doctrine quite consonant with theory, and receiving support from melancholy experience.

Yet, how rarely do we see a case of disease in which nature does not make some attempt towards a cure. We know, that in a few cases of perforation of the intestine, general peritonitis does not take place, as the effusion and organization of lymph prevents the transit of the fœcal contents.

We have then in the treatment of this disease, two indica-

tions. The first, to support the strength of the patient as far as this can be done without injury. The second, to prevent the further effusion in the peritoneal cavity, by endeavouring to induce organization and adhesions of the effused lymph. It is obvious, that towards fulfilling this last indication, all that is wanted is time, and to diminish the peristaltic action of the intestine, as far as possible. Now, in the exhibition of opium in large doses, I think we have a remedy calculated to fulfil these ends.

I must here observe, that in proposing opium in large doses for the cure of bad forms of peritonitis, I am by no means original. Nine years ago, Dr. Graves treated successfully two cases of peritonitis after tapping, and occurring in patients of a bad habit, by opium, without withdrawing a drop of blood, and more lately employed the same remedy in a case of peritonitis, from the effusion of purulent matter into the serous sac, to which I shall presently allude. Drs. Cusack and Gooch also have spoken of the utility of opium in low puerperal peritonitis, but I believe I was the first who, by applying these principles to the treatment of peritonitis, from perforation of the intestine, even dared to hope for the possibility of a cure in this disease, and in my hands the remedy has been administered with great boldness.

I shall now relate two cases where this treatment has proved efficacious.

A boy, aged 12, was admitted into the Meath Hospital, in September, 1829. He had been ill for ten days with symptoms of an inflammatory affection of the digestive tube, for which no proper treatment had been adopted for the first seven days. He was then seen by Mr. Pakenham on account of a sudden aggravation of symptoms. This gentleman found him in a state of great exhaustion ; pulse 58, sharp and intermittent ; countenance sunk ; the belly universally tender ; frequent vomiting ; diarrhœa and tenesmus. The belly was leeched, and calomel and opium exhibited; next day, the pulse having

risen, a small bleeding was performed, but the blood was not inflammatory.

On admission, his countenance was collapsed, anxious, and expressive of dreadful suffering, the extremities were cold, and the pulse hardly perceptible. The respiration hurried, and the abdomen swelled, and exquisitely painful.

In this case I made the diagnosis of peritonitis, from ulcerative perforation of the intestine. It was plain, that the antiphlogistic treatment could be pursued no further. From having witnessed the good effects of the opium treatment in the case of peritonitis, from purulent effusion, under Dr. Graves, I determined on attempting the same treatment. The black drop was given every second hour, so that in the next twenty-four hours, the patient had taken sixty drops of this preparation. I also directed mercurial frictions to the belly, but these seemed to have no influence on the system. Next day, the most marked improvement had taken place; the pulse had become full and soft, and the extremities warm; the countenance had altogether lost the hippocratic expression, and the patient could bear pressure on the abdomen. On the day before, he was nearly insensible to surrounding objects, but now expressed great relief, and confidence in recovery. The same treatment was persevered in for the next twenty-four hours, when *all* symptoms of abdominal inflammation had completely subsided. The belly felt natural; there was no tenderness; the pulse was good, and the patient declared himself well. At this period of the case, I omitted the opium, and exhibited the mildest possible saline laxative, as no stool had taken place for more than forty-eight hours; four evacuations took place, followed by an immediate return of all his former symptoms, under which he speedily sunk.

Dissection.—The abdomen was distended, and tympanitic; the intestines were every where agglutinated together, and adherent to the parietal peritoneum, except in the left iliac fossa, where a quantity of yellow puriform matter was collected.

Small quantities of the same fluid were found between several of the intestinal folds, circumscribed by the effusion of lymph; general livid redness of the serous membrane. On detaching the caput coli from the peritoneum lining the right iliac fossa, a small perforation of the gut was discovered, by the escape of the contents of the intestine in a jet. The serous membrane lining the iliac fossa, was found of a bluish colour, and softened for a space of three square inches; this change was also observed in the lower portion of the ileum. The perforation of the large intestine before-mentioned, was apparently the result of an apthous ulceration, as no glandular enlargement, or ulceration, could be detected round it. There, however, them ucous membrane was softened, and of a deep red colour, while the remaining portion of the intestine was healthy.—*Dub. Hos. Reports*, vol. v.

I shall remark merely on this case, that if my mind had not been warped by an early and unfounded prejudice as to the necessity of evacuations from the bowels, the life of this patient would in all probablity have been saved. It is plain, that if in any case purgative medicine must be more hazardous than in another, it must be here, where the peristaltic action will constantly tend to prevent the closing of the ulcerated communication. The slight extent of disease in the mucous membrane increases the probability, that under other circumstances this patient would have recovered.

The next case had a more fortunate result, which I attribute to the dear bought experience of the last.

A middle aged man was admitted on the 27th of June, 1830, apparently in the last stage of peritoneal inflammation. The disease was of three days' standing, had supervened suddenly, in a few days after hypercatharsis, induced by a large dose of glauber salts, and followed by long continued exposure to cold. It was attended by the usual symptoms of peritonitis, from ulcerative perforation of the intestine. The belly was swollen, and so exquisitely tender, that the slightest pressure

made the patient utter screams. The countenance was hippocratic, and the patient tormented with constant hiccup. Coldness of the extremities had commenced, and the pulse was weak and slow. Before the hour of visit, leeches had been applied to the belly without relief, the patient was then ordered one grain of opium every hour.

The next day, it was found that the symptoms had improved. The patient had not experienced the slightest coma, headach, or delirium. The same plan of treatment was persevered in, the daily dose of opium being gradually diminished until the 7th of July, when the convalescence being completely established, the remedy was omitted. During this time diarrhœa set in for three or four days severely; this was treated by the application of a few leeches to the anus, and the use of anodyne enemata.

The patient took in all one hundred and five grains of opium, (exclusive of that in the injections) without ever experiencing any of the usual effects of this substance, when exhibited in large doses.—*See Mr. Hart's Essay, Dublin Hospital Reports,* vol. v.

I would submit that in this case there could be little doubt, but that the peritonitis arose from an ulcerative perforation of the intestine. The symptoms were perfectly similar to those in which we had before unerringly made the diagnosis, and the supervention of the peritonitic symptoms after the hypercatharsis, is quite in accordance with this view. The power of bearing these great doses of opium in these cases, is most remarkable, and is almost always observed. How far the exemption from its usual effects on the nervous system is explicable by the violence of the abdominal disease, is worthy of consideration.

Since the occurrence of these cases, I have used the same remedy in cases of the ordinary peritonitis, where bleeding was inadmissible; and have had no reason to change my high opinion of its powers. In one case, where death took place,

the remedy was borne without the slightest inconvenience. In two cases lately occurring in the hospital, the same treatment has been pursued with the most striking benefit.

I shall now relate the case of hepatic abscess, which first led to this mode of treatment in peritonitis, from perforation of the intestine.

A woman was admitted, labouring under an enormous hepatic abscess, of four months' standing. She was emaciated to the last degree, and laboured under severe hectic fever. It was attempted to give exit to the matter, by inserting a caustic issue over the abscess; but after a lapse of nine days, it was found that this had not succeeded. A small valvular incision was then made through the ulcer, when a few ounces of puriform matter escaped. This operation was immediately followed by excruciating pain in the lower part of the belly, and a sensation as if matter was escaping into the peritoneal cavity. In three hours, there was violent pain of the abdomen, increased by pressure or the extension of the knees, which she kept constantly drawn upwards; the countenance was anxious and collapsed. There was constant vomiting, and the patient uttered piercing cries. Pulse 146. Small and wiry. Under these circumstances, Dr. Graves concluded, that the matter had found its way into the peritoneal cavity, and he determined on treating the case as he had formerly treated those of peritonitis after tapping. A blister was applied to the arm, and the vesicated surface directed to be sprinkled with the acetate of morphia. Half grain doses of opium were given every two hours, and porter allowed for drink. The patient bore the opium without any inconvenience, and in a few days all the symptoms of peritonitis subsided. She ultimately sunk in a state of complete exhaustion 27 days after the operation.

On dissection, the liver was found enormously enlarged, with its convex surface adherent to the parietal peritoneum. A vast abscess occupied nearly the whole of the right lobe, coming to within a few lines of the serous membrane superiorly;

in the left lobe were several small abscesses. There was no fluid effusion or other marks of inflammation in the peritoneum, having existed at the time of death; but it was evident, that the patient had recovered from a recent peritonitis, as all the convolutions of the intestines were connected by lymph, in a state of semi-organization; it was not yet transparent, and vessels could be distinctly seen running through its substance.—*Dublin Hospital Reports*, vol. v.

We have every reason to believe, that this was a case of peritonitis, from the effusion of pus into the peritoneal cavity. The small quantity of matter given exit to, and the *immediate* supervention of the symptoms, with the appearances on dissection, strongly go to prove the truth of this opinion. In this also, it is remarkable, that although the patient was in the very last stage of marasmus and debility, she bore these large doses of opium without the slightest inconvenience.

I have now detailed cases illustrative of the utility of opium in large doses in peritonitis, arising from the introduction of fœcal and of purulent matter into the serous cavity. I would further propose it as a remedy in cases of rupture of the bladder and uterus, and in peritonitis after the operation for strangulated hernia. I am at present trying its powers in a case of recent pneumo-thorax from pulmonary fistula. In two cases of peritonitis after tapping, where the patients were in a low state previous to the operation, the exhibition of these large doses of opium, without drawing any blood generally or locally, has succeeded in my hands in removing the disease and saving the life of the patient. This appears to be a peculiarly appropriate case for the opium treatment. The patients are generally cachectic, either from original constitution or the disease. They almost all labour under visceral disease and obstruction, and a state of collapse commonly follows the operation. All these circumstances go strongly against our use of the usual antiphlogistic treatment; it was in a case of this kind which occurred in the old Meath Hospital, in the year 1822, that Dr.

Graves first ascertained the great importance of opium in this disease. A woman had laboured under ascites, for which she was tapped; the operation was followed by the symptoms of peritonitis. When Dr. Graves saw her, she appeared in the last stage of the disease, she had constant vomiting, hippocratic countenance, cold extremities, the belly exquisitely tender, and the pulse 160 in the minute, and nearly imperceptible. The case appearing hopeless, Dr. Graves determined on merely endeavouring to allay the distressing symptom of vomiting, and administered a drachm of laudanum. The patient soon after fell asleep, and awoke refreshed, with a more warm surface and fuller pulse; the vomiting had ceased. The same remedy was used in smaller doses every fourth hour, and in the course of two days all the unpleasant symptoms had disappeared.

I now proceed to submit some cases of diseases of mucous membranes, where the use of opium has proved efficacious. From having witnessed its utility in cases of inflammatory states of serous membranes, where the inflammation might be termed, for want of a better name, *asthenic ;* it appeared probable, that the same condition of mucous membranes might be benefited by it.

It is now some months since I was called to see a gentleman labouring under all the symptoms of gastro-enteritis, in a severe form. He had considerable fever; thirst urgent; constant smacking of the lips; respiration hurried, *without disease of the respiratory system ;* a red tongue, and great tenderness of the belly. The usual treatment was pursued, but the disease shewed great obstinacy, and after six weeks' continuance the situation of the patient appeared hopeless. At this time a violent bronchitis supervened, and so great were the sufferings of the patient from the accumulation of mucus in the trachea, that, on three occasions I left him, never expecting to see him again. It was remarkable, that during this attack,

the symptoms of abdominal disease greatly subsided. Under a stimulating treatment he recovered from the bronchitis, only to relapse into his former state. The abdominal symptoms now became still more urgent; the belly swelled from tympanitis; the verge of the anus became surrounded by large and irritable hæmorrhoids; there was extraordinary prostration and constant low delirium. Under these circumstances, a diarrhœa supervened, at first slight, but afterwards so severe as to threaten every day death from exhaustion. A great variety of means were tried, but without avail. At this time, when the patient seemed in articulo mortis, I ordered him a grain of opium every hour; this he took regularly for the first twelve hours, *without any inconvenience,* and he experienced some refreshing sleep. Next day, the remedy was continued in the same dose every second hour, and from this time his improvement was rapid; and I rejoice to say, that he is now in the enjoyment of good health.

This was a fair case for the trial of this *heroic* remedy, as all our other means had failed. I have never seen a disease more intractable to common treatment, than the diarrhœa under which this gentleman laboured.

The next case is one to which I confess I look back with great pleasure. It is that of a patient named Molyneux, who was admitted in the beginning of February last into the Meath Hospital, complaining of sore throat and pain shooting through both ears. His countenance was haggard; his voice raucous; and the body emaciated. An extensive and unhealthy looking ulcer, covered with a whitish matter, was found to occupy the left tonsil, the back of the pharynx, and left side of the uvula. The patient denied having had venereal, but circumstances led us to suspect this; he had, however, been frequently salivated in India for abdominal disease and fevers. He first felt the soreness of his throat six weeks before admission, which was the time when his vessel made the British channel. We ordered the patient the sarsaparilla decoction with nitro-muriatic acid,

and touched the sore with a strong solution of nitrate of silver, which caustic was changed in some days for the butter of antimony. No good effect was produced by these means, the sore extended quite round the uvula, which it rapidly destroyed. The breath became fœtid; the cough laryngeal; the patient's appearance was still worse than on admission; his nights were sleepless, and he complained much of pain in the head.

I now changed the plan of treatment; omitted the sarsaparilla and the lotion, and ordered a gargle of chloride of lime with the internal use of six grains of opium daily, and an increase of his wine. At once the sore began to assume a more healthy appearance; the fœtor of breath diminished greatly, and in a few days wholly disappeared. After a short time, in consequence of want of sleep, we increased the dose to eight grains, on which he has been kept since the 20th of February. The sore is now healed, and the whole state of the patient singularly improved.

This man has, in the course of a few days, taken upwards of a hundred grains of opium, without experiencing any of its poisonous effects. His slumbers have been light and interrupted, his intellects clear, and his bowels have not been constipated, as he has had one evacuation daily, since the beginning of this treatment. He only complains of a slight difficulty in passing urine. In this respect, the case resembles those which I have brought forward, and I may here mention, that whenever the remedy produces its poisonous effects, it appears to be a sign that in that particular case, its singular influence over inflammatory action, will not be produced. Like the tartar emetic, as observed by Laennec, it acts best where there is no sensible effect produced, but the diminution of the local disease.* There is at present in the Meath Hos-

* It is most interesting, that in this case and in another, no narcotism was produced *until the patient was convalescent,* as if the existence of the disease caused the tolerance of the opium.

pital, a woman, who for an enteritis, has taken 18 grains of opium in the last 48 hours: in this case, there was, previous to use of the opium, retention of urine, but this has now completely subsided.

I know of the case of a child who laboured under infantile remittent. After some time diarrhœa came on, with a great increase of fever. Small doses of Dover's powder were ordered, but the mother accidentally gave several doses at once. The child fell into a profound coma, which lasted for two days, at the end of which it awoke, perfectly free from fever, and had a large and healthy evacuation. In this case there was no relapse.

Hitherto I have alluded to the employment either of simple opium, or its tinctures. In Dr. Bardsley's interesting collection of Medical Observations, several cases are detailed, where in affections of the stomach, the acetate of morphia was employed with benefit. I am persuaded, that it is a remedy of great power, particularly in chronic cases of dyspepsia, where there is much acidity. I was consulted some months back by a gentleman who has led a very dissipated life, and who for the last ten years has been a martyr to the worst symptoms of dyspepsia. About two years ago, he had a violent attack of hæmatemesis, and latterly, the stomach had become so irritable, that it was scarcely possible to find any article of diet to agree with him. His sufferings were dreadful. After trying other means ineffectually, I ordered the $\frac{1}{8}$ of a grain of the acetate twice a day. He took the remedy three times in the day, with the most perfect relief. The secretion of acid which had been enormous, was suddenly checked, and the patient in two days declared that he felt better than he had done at any time for the last ten years. His appetite was good, and he foolishly indulged in articles of diet from which he had long abstained. On the fourth day, while in the highest spirits, he became pale; fell, and threw up several pounds of blood. The remedy was of course omitted. In about a fortnight, all the former unpleasant symptoms returned,

and his indigestion was as complete as ever. I now ventured on exhibiting the morphia again, but in the doses of the $\frac{1}{16}$ of a grain, twice in the day. This diminished dose again produced the same improvement, but in a few days was followed by a return of the hæmatemesis.

The next case, is one of a gentleman who has been for a length of time in the East Indies, and who has become a victim to hepatic disease. He is subject to attacks of pain in the epigastrium, followed by jaundice and fever. These have been treated by leeching, purgatives, and the use of mercury; but during the last attack, his debility was so great, that I did not wish to venture on this treatment. The acetate of morphia was given twice a day. It was commenced on the 26th of December, and continued till the 18th of February. The greatest improvement has been made in this gentleman's state. The pain has disappeared; there is now no tenderness; the jaundice has subsided, and what is most remarkable, his bowels now act regularly without the assistance of medicine. He has gained flesh, and his whole appearance is singularly improved.

I had intended to add to this paper, the results of some researches on the exhibition of opium in free doses, in cases of fever, where there is a species of excitement of the nervous system, very analogous to that which occurs in delirium tremens, but as I propose to pursue this investigation farther, I shall reserve the results for a future communication.

It is proper to observe here, that the exhibition of opium in large doses has been proposed by Mr. Hart, in cases of fœcal effusion into the peritoneum, from injury of the intestine, with a view of controlling the peristaltic action. In this opinion, Mr. Hart has approached to the doctrines put forward in the Report of the Meath Hospital, by Dr. Graves and myself.

The following conclusions appear justifiable from the facts now recorded.

1st—That in certain cases of inflammation of serous and mucous membranes, where depletion by blood-letting, or other

antiphlogistic measures are inadmissible, and the system in a state of collapse, the exhibition of opium has a powerful effect in controlling the disease.

2nd.—That under these circumstances, the remedy may be given in very large doses, with great benefit and safety.

3rd.—That its effect then is to raise the powers of life, and remove the local disease.

4th.—That the poisonous effects of opium are rarely observed in these cases; the collapse and debility of the patient appearing to cause a tolerance of the remedy.

5th.—The cases in which the utility of this practice has been ascertained, are as follow:

Simple peritonitis, in a stage where bleeding cannot be performed. Low puerperal peritonitis. Peritonitis from perforation of the intestine; from the opening of an abscess into the sac; or lastly, after the operation of paracentesis in debilitated subjects. Violent diarrhœa, supervening in an exhausted subject. Phagedenic ulceration of the throat, in a similar individual. And cases of chronic gastritis, and gastro-duodenitis in patients exhausted by the long continuance of the disease.

6th.—The cases in which this mode of treatment would be probably useful are,—peritonitis from rupture of the bladder, or uterus, traumatic rupture of the intestine, or after the operation for strangulated hernia.

The last observation which I shall make here is, that in most of these cases, particularly in those of diseases of serous membranes, wine was given in conjunction with the opium, and in all the patients were supported by a lightly nutritious diet.

Art. XI.—*Observations on the spontaneous Amputation of the Limbs of the Fœtus in Utero, with an Attempt to explain the occasional Cause of its Production.* By W. F. Montgomery, M. D., M. R. I. A., Professor of Midwifery to the King and Queen's College of Physicians in Ireland.

Several of the writers who have expressly treated of the pathology of the fœtus, in their enumeration of the accidents to which it is liable during its uterine existence, mention the fact of the occasional separation of portions of the limbs;* and especially Desormeaux in his elaborate and able article on the "œuf humain" speaks of it as an instance of spontaneous amputation, which he attributes to the effect of inflammation and gangrene.

But none of these authors appear to have witnessed or examined any case of the kind themselves, nor can I find a satisfactory reference to any such case in any author within my reach, except those which are now to be noticed.

In the London Medical and Physical Journal, vol. liv. p. 38, Mr. Watkinson relates the following case. Being called to a lady, aged 20, in her first labour, which was natural and easy; when the child was expelled, "he discovered that the left foot had been amputated a little above the ankle, and the part nearly, but not quite healed."

The child was alive, and gasped for twenty minutes, when it expired. The mother had only gone seven months. On examination after the birth, the foot was found in the vagina, and it also was nearly healed. *There did not appear to have been any hæmorrhage from the limb;* the separated foot was much smaller than the other, which was rather turned inward;

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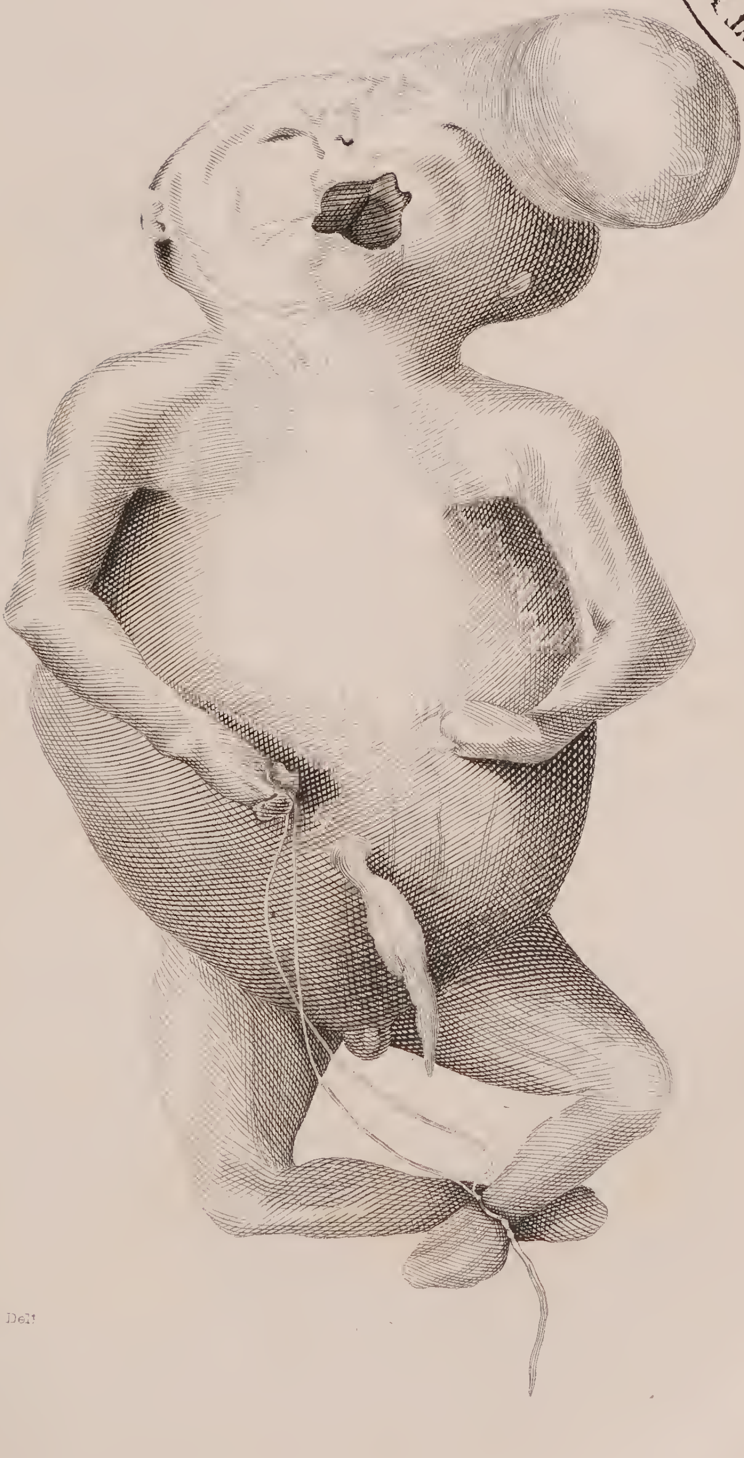
* Vide Billard, Maladies des Enfans, p. 623. Haller, Elem. Phys., tome viii. Murat, Dict. des Sci. Med. tome xvi. p. 70. Richerand, Elem. de Physiologic, p. 477. Desormeaux, Dict. de Medicine, tome xv. p. 404.



it showed no mark of putrefaction, but appeared to be in a state of perfect preservation. The mother said she had not been frightened, nor had any unpleasant circumstances occurred in her family to give her the least uneasiness; her circumstances were sufficiently easy to render unnecessary any over exertion on her part.

The parts here described were examined by the Editors of the Journal, and a sketch of them is subjoined to the description.

M. Chaussier examined two cases in which separation of a part of the forearm had taken place before birth; and in a third case of the same kind, he found the separated portion of the arm and the hand lying in the membranes, and as in Mr. Watkinson's case, the stump was healed.*

Chaussier also attributes the accident to gangrene, as the cause which would most obviously account for its production; but it does not appear from his account, that there were present any of the pathological evidences of that condition; and indeed as a general explanation, this appears hardly admissible, when we recollect that in the first case related, the child was born alive, and neither the stump nor the part amputated, showed any symptom of disorganization or disease, nor was the latter even discoloured.

Without pretending to discuss the different causes likely or unlikely to produce so remarkable a change, I shall proceed at once to describe the case which occurred to myself, and which appears to me to offer one explanation at least, of the phenomenon under consideration.

About three years since, I was suddenly called on to see a patient who was miscarrying in the fifth month, with violent hæmorrhage. On examination, I found the fœtus partly expelled from the uterus, and lying in the vagina, from whence I readily removed it by slight pressure with my finger; the

* Discours prononcé a l'Hospice de la Maternité, 1812.

cord was broken off, at about an inch and a half from the umbilicus; the secundines were retained for three or four days, without any return of hæmorrhage, and were then expelled whilst the patient was evacuating the bowels. She recovered well.

Observing the unusual figure of the head, I laid by the fœtus for examination, and having placed it in clean water for the purpose, I was greatly struck with the appearances it presented.

The shape of the head was altogether deformed and monstrous, and the brain, which at the left side was covered only by the common integument, towered upwards like a helmet over the head; but the circumstance which most forcibly attracted my attention was, the appearance of distinct ligaments on the limbs; and examining closely, I found them in the following condition:

There were distinct threads, of, I presume, organized lymph passing from both hands to the legs; at one end these threads, which very much resembled the kind of thread called ardis, had formed a complete ligature round the middle of each hand, causing a distinct depression where it passed, the part of the hand below it being almost completely undeveloped; from the hands these threads descended, at both sides towards the legs, which were crossed, and surrounding them in this position, just above the ankles, so tightly, that fully two-thirds of their whole thickness were thereby divided, without, however, any breach of the skin having taken place, nor was there the slightest appearance of disorganization or discoloration of any of the parts, but as were the hands, the feet also were imperfectly formed, totally undeveloped, and of course misshapen. These circumstances are very accurately represented in the drawing executed by my zealous and accomplished pupil, Mr. J. Bullar, (*see Plate*,) and the fœtus itself is preserved among the preparations in my museum. The mother was about 25 years of age, and at the

time labouring under fever, but had been previously in perfectly good health, and had not met with any accident or circumstances of either bodily injury, or mental agitation.

From the condition of the limbs thus produced, and the impossibility of the parts below the ligatures continuing their growth under such circumstances, it seems exceedingly probable that had the child continued to live and grow, the parts of the legs below the ligatures would have been separated, and thus undergone spontaneous amputation. The formation of these threads, and particularly their application so as to stricture the limbs, are circumstances in explanation of which I do not feel prepared even to hazard a conjecture, nor can I find in the authors who have treated of such subjects, more than a mere allusion in some of them, to the fact, that the fœtal limbs are occasionally separated, and by all it seems taken for granted, that mortification is the agent of the change.

The only passage which I can find apparently relating to the state of parts just now described, is in the Elementa Physiologiæ of Haller, tom. viii. p. 135; it is as follows: "Huc faciunt alius fetus, cui artus retracti, compressi, *ligamenta stricta*, &c. &c.," the last phenomenon he quotes from one of Rœderer's works, which I regret I cannot find in any of our libraries, and am therefore unable to ascertain how far it might bear upon or illustrate the fact before us. It does not appear from any passage in his writings, that Haller was himself aware of any such case from personal observation. He gives, indeed, a long list of extraordinary mutilations in the fœtus, attributed by authors to the effects of mental emotions in the mother, or of accidents sustained by her; but he immediately pronounces most of them to be "adeo fabulosa ut fidem auferant," and he obviously considers such cases as the result of imperfect development or of malformation, and not of separation or removal of the parts already formed, objecting to the authors who have furnished such descriptions, that they cannot even quote one instance, in which "manus truncata, aliusve artus in membranis fetus

seorsim a corpore repertus sit;" two such instances at least, have, in the foregoing remarks, been laid before the reader, and with regard to the case which I have added, I will only venture to say, that it appears to me to afford at least one solution of so mysterious an occurrence, and should it appear, as of course it must, that the explanation thus supplied is so far unsatisfactory, that it is itself the result of a process equally inexplicable, it should be recollected, that very many indeed, if not all the physiological and pathological results which we witness, are, as to the mode of their production, enveloped in a similar cloud of obscurity: I think the fact which I have here added, leads us at least one link farther in the chain of causes and effects, and if so, even though the advance should be but of one step on the road to knowledge,

"Est quôdam prodire tenus si non datur ultra."

Art. XII.—*Observations on the Treatment of various Diseases.* By Robert J. Graves, M. D., M. R. I. A., King's Professor of the Institutes of Medicine, one of the Physicians to the Meath Hospital, &c. &c.

Many eminent physicians have expressed the opinion, that it is the duty of every one engaged in the practice of medicine, to record whatever he observes, capable of throwing light on the application of remedies or the nature of diseases. In compliance with this opinion, I have resolved to publish the following facts, without undertaking the task of embodying them in the form of a connected essay. As these facts refer chiefly to the effects of certain remedies on particular complaints or particular symptoms, the reader must expect in this communication, practical, not pathological remarks; an account of the success or failure of medicines, rather than observations on the nature of disease.

PTYALISM.

A middle aged woman, of delicate appearance, applied to me for advice on the 26th of December last. She had laboured under a profuse and long continued leucorrhæa, which ceased rather suddenly in the beginning of September, and was followed by a slight degree of anasarca. This disappeared under a course of diuretic and purgative medicines, but she remained in a debilitated state, and experienced much distress from irritability of stomach, and finally from obstinate retching. In October this symptom also suddenly subsided, and was succeeded by a remarkable and profuse salivation, which continued unabated, notwithstanding the use of various purgatives, tonic and astringent medicines, gargles, &c.

In twenty-four hours she spits more than a pint and a half of fluid, consisting of a whitish, viscid mucus, secreted by the mucous membrane of the fauces and back of the pharynx, from whence it is thrown into the mouth by a *hawking*, renewed every two or three minutes, with scarcely any interruption either during the night or day, and rendering the patient truly miserable from want of sleep. The throat and fauces are pale; and their soft parts extremely flabby and relaxed, although there is a constant irritation in the throat in consequence of the presence of an unnatural quantity of mucus, yet no soreness is felt, neither do the parts appear inflamed. The salivary glands are not concerned in the disease, and do not secrete more than the usual quantity of fluid. Her appetite is very bad, her skin dry, and she has a haggard, emaciated countenance.

The well known good effects of opium in several diseases of increased secretion, diabetes, diarrhœa, and certain forms of dropsy, suggested to me the trial of this medicine in the apparently almost hopeless case I have related, and I accordingly ordered the patient one grain of opium every fourth hour.

On the following day, she returned to inform me that she had slept during the whole night, and on awaking had no return of the spitting. Her joy was great, and she and her friends considered the effect of the pills, in thus suddenly stopping the spitting, as most extraordinary; and I must confess, that my surprise was almost equal to their's. She then told me, that several medical students who lived in her house, and who had witnessed the previous violence and obstinacy of her complaint, had been so much struck by its sudden cessation under the influence of the pills, that she was commissioned by them to inquire what I ordered. I mention this circumstance, to shew how very remarkable was the benefit she received from the opium. The pills were continued for some days, when the quantity of opium was augmented on account of some recurrence of the spitting; unfortunately they induced constipation of bowels, and consequently, she has been frequently obliged to leave them off, but she is, on the whole, much improved in health, and although she is still subject to the disease, its severity is comparatively trifling, and it uniformly disappears almost entirely when she recurs to the use of opium. She visited me this day, the 18th of March. In connexion with this subject I may observe, that a lady, a patient of mine, who took a large quantity of mercury many years ago, has been ever since subject to occasional returns of salivation, in *every respect* resembling that produced by mercury. During these fits, which are always brought on by exposure to cold, the mouth is sore; the gums red and swollen; the salivation copious, and the breath is strongly impregnated with the mercurial fetor. Several such cases have been recorded by others, and are extremely instructive, proving that the deleterious effects of mercury on the system may lie long dormant, and be afterwards suddenly called into action by various causes. In this way we may explain the attacks of periostitis, to which persons who have been mercurialized, are often liable for years, upon exposure to cold. Formerly such attacks were indiscri-

minately attributed to a remnant of the syphilitic taint, but I have witnessed the same occurrence in persons who had no syphilitic disease, and who had taken mercury for other complaints. One of the most violent attacks of periostitis I ever witnessed, followed salivation in a lady to whom mercury had been given séveral months before, for the cure of peritonitis To conclude, I have seen many cases totally at variance with the assertion of Ballingall and others, that the secondary symptoms, attributed by recent authors to mercury, are owing to lues; not being observed, as they state, except in cases where that medium had been exhibited for the cure of the venereal disease. The venereal poison produces a peculiar train of primary and secondary symptoms. The mercurial another, and that not very dissimilar. Experience has proved, that in general the venereal symptoms yield to the action of mercury, but occasionally this is not the case, in consequence either of some constitutional peculiarity, or an injudicious use of this mineral, and thus the constitution labours under a modified disease, resulting from the combined effects of the two poisons. Attention to the effects of the remedy in the first instance, will generally prevent the occurrence of so disastrous a complication. My own experience has convinced me, that the majority of venereal cases may be cured by the non-mercurial plan of treatment; but whenever the disease, whether primary or secondary, proves more than usually obstinate, the practitioner should then have recourse to mercury; the previous treatment will render its curative influence at once safer and more energetic.

COLD AFFUSION IN CONVULSIONS.

No application is more common than that of cold to the head in diseases of the brain, but the use of cold affusion in the convulsions of children and young persons, has not attracted the attention it deserves; at least those who have witnessed the progress of such cases under the care of the most eminent

practitioners in Dublin, say they have seldom seen this remedy applied. I have indeed reason to believe that its utility was known to a few, but it has never been generally adopted, and I myself, for the first time, saw it practised by others, in the case of a child two years old, successfully treated in this manner by Dr. Ireland.

The following case I have selected, as the most remarkable of those which came under my own immediate observation:

In the month of last January, I was sent for at the desire of two professional gentlemen, to see a young gentleman, nine years of age, in whom convalescence, from a severe attack of scarlatina, had been interrupted, at first by anasarca, and afterwards by convulsions. The latter had come on quite suddenly at six o'clock in the morning, three hours before my visit, and the fits had been so violent, and succeeded each other so rapidly, that at nine o'clock he appeared to be moribund; his eyes were distorted, void of expression and fixed; face cadaverous; extremities cold; his pulse very feeble, and so rapid, (145—150) that it could not be counted with any degree of precision. In addition, he appeared to be nearly destitute of muscular power, and in the interval between the fits, was unable to speak, while a loud tracheal râle seemed to announce the near approach of death. As I have detailed the symptoms of the case with the most scrupulous fidelity, and without the least exaggeration, I need scarcely add, that our patient's state appeared utterly hopeless. Our first step was to place him in the arms of a strong nursetender, who maintained him, as nearly as possible, in the sitting posture; our object in this was to relieve the lungs, and diminish the cerebral conjestion. Those who have watched over the dying, are aware that the final struggle may be often much protracted, by frequently changing the patient's position in bed, and particularly by avoiding the horizontal posture. This mode of proceeding, by preventing the gravitation of the blood to any one part of the lungs, and by counteracting the accumulation of mucus in any particular por-

tion of the bronchial tubes, causes both to remain for a longer time pervious to the air, and favours the last efforts of the respiratory apparatus. We next proceeded to pour a small stream of cold water from a kettle on his head, the effects were extremely satisfactory, for in a short time the eyes assumed a more natural appearance, and lost the spasmodic fixedness, while the pulse became more and more distinct, and diminished in frequency; in short the violence of the fit soon subsided, he was able to expectorate the mucus which had clogged the larger air passages, and had caused the *rattles,** and in the course of half an hour a very marked improvement was perceptible, the patient being then able to speak and swallow. The convulsions, however, returned several times during the ensuing day, but at each recurrence, their duration was lessened, and their violence diminished by the cold affusion. Sitting by the bed of this patient, I more than once was able to predict the immediate approach of the fit, by means of watching the pulsation of the carotids, which then became much more frequent and stronger. This observation, in connexion with the fact, that the pulse at the wrist became weaker, and more indistinct at that very moment, suggests many interesting considerations concerning local determinations of blood.

It is almost unnecessary to remark, that the time we had so unexpectedly gained, was not spent in inaction, and that we immediately had recourse to various other active remedies, such as leeching the neck, purgative injections, and mercurials, administered both internally and externally, with a view of affecting the mouth rapidly. In addition to the modes of applying mercury usually employed, I can recommend the application of the ointment to the armpits; this alone will frequently affect the mouth in a few days. The motions of the patient's arms here perform the office of friction, and this part of the skin seems to possess very

* No bronchitis or pectoral affection was present, and consequently the *tracheal râle* (rattles) was of the most ominous import.

active absorping, as well as exhaling powers, and is likewise more protected from the contact of the clothes, &c., so that the ointment is less easily wiped off and wasted. With regard to local detraction of blood where there is determination to the head, experience has taught me, that in no case ought we to apply leeches to the temples. This is a very important observation, and applies to the treatment of various cerebral affections, such as occur in fever, apoplexy, paralysis, hydracephalus, &c. &c. Leeching the temples in such cases, not unfrequently aggravates the cerebral symptoms, whereas, if the leeches are applied behind the ear, or what is still better, along one side of the neck, this untoward event will be avoided. I say along one side of the neck, because we are thus enabled to promote the flow of blood where the leeches fall of, with less annoyance to the patient, than if leeches had been applied at both sides. A most instructive monograph might be written on the application of cold to the head in various diseases; at present, much mischief frequently arises from practitioners being unacquainted with the different degrees of cold suitable to different states of the cerebral organ, and the different methods of conducting its application, so as to produce relief. In one case of fever, I saw violent mania immediately follow the injudicious application of ice to the head; and in another, much difficulty was experienced in saving the life of a young person, in whom a collapse of the system, without relief of the local affection, had been induced by the too copious and continued application of cold water to the head. Where very violent pain in the head occurs in fever, the *cold dashing* with water from a height, as recommended by Dr. Smith in his excellent treatise, is often a most valuable remedy, but in convulsive diseases like that now described, this application is too violent; in such cases, the stream of water should be small, not poured from a height, and should be discontinued the moment the fit ceases, to be again renewed on the approach of another paroxysm. I am informed by an eminent practitioner of this city,

that he twice witnessed fatal convulsions follow the injudicious use of cold affusion in mania. The efficacy of cold affusion in delirium tremens, in asphyxia, in cases of over doses of prussic acid, &c., prove that it is too powerful an agent to be indiscriminately applied.

The young gentleman, whose case occasioned the foregoing remarks, recovered in the course of a few weeks, and is now perfectly well.

HYDROPHOBIA.

A very fine boy, twelve years of age, affected with well marked symptoms of hydrophobia, was placed under my care in the Meath Hospital, in December 1826.

The disease was fully formed, although of very recent origin, and was caused by the bite of a mad dog. The powerful action of strychnine on the nervous system, induced me to try its effects, but it was not found to exert any apparent influence in arresting the destructive progress of this truly appalling disease. The strychnine used on this occasion, had been prepared with the greatest care, and was exhibited in very large doses, both by the mouth and through the skin, previously denuded of its epidermis.

The post mortem examination displayed nothing unusual, either in the tongue, pharynx, alimentary canal, or cerebro-spinal system.

TETANUS TRAUMATICUS.

In 1830, I had an opportunity of trying the effects of tobacco in this disease, but am sorry to say without a favourable result. The failure of the medicine could not be attributed to want of diligence in its administration, or to its being exhibited in insufficient doses, nor was the case so rapid in its progress as to prevent the remedy from getting a fair trial.

NEURALGIA OF THE MAMMÆ.

An unmarried lady residing in the neighbourhood of Dublin, consulted me in July 1829, for this affection. She was of

the sanguineous habit, robust, and otherwise healthy. The disease had lasted two years with various degrees of violence; the breasts being at times nearly free from pain, but generally they were very troublesome. During the paroxysms, which often lasted several days, and sometimes considerably longer, the mammæ, which in this lady were full and large, became extremely painful and tender, but were neither tumefied, hard, or red. The intervals between the paroxysms were marked not only by a total cessation, but by a gradual diminution of pain. At no period had there been any spinal tenderness. One breast was not more affected than the other, and the axillary glands were not swollen. She had consulted several practitioners, had taken much medicine, and made use of many topical applications, without relief. Leeches had been repeatedly applied, but their bites had invariably caused excruciating pain, and the bleeding they occasioned was not followed by the least relief. I at first tried stupes, narcotic liniments, and plasters, with warm salt-water baths, but these measures were unattended by the least improvement. The absence of complete intermissions, and of well marked paroxysms, prevented me, during several weeks, from perceiving the true neuralgic nature of this pain; at last this view of the subject occurred to me. I tried the carbonate of iron, with marked benefit. The disease has since frequently recurred, but its violence has always been lessened by the carbonate of iron. Sea bathing she likewise finds useful. I may hear observe, that in those cases of neuralgia, in which carbonate of iron proves useful, I never find it necessary to raise the dose beyond one drachm, three times a day. Indeed a larger dose than half a drachm is seldom required. This statement of my experience, I consider necessary to counteract the impression made on the minds of students by a perusal of some of the London periodicals, where enormous doses of carbonate of iron are recommended, by no less an authority than the justly celebrated Dr. Elliotson. I have

examined this subject in a practical point of view with great attention, and think, that what is true concerning carbonate of iron, applies also to most tonic medicines. In fact we may consider it as a general rule, that tonics are rarely indicated, where moderate doses do not effect the desired purpose. This applies more particularly to the stronger tonics, such as the salts of iron, of arsenic, and quinine. I can scarcely conceive a case possible, in which a judicious physician will find it necessary, for instance, to give more than ten grains of sulphate of quinine in a day, and yet much larger doses are not unusual here and elsewhere. Whenever the symptoms supposed to call for such a treatment, resist moderate doses of sulphate of quinine, we ought to pause, and reflect whether another plan of treatment ought to be adopted. There are two states of the system attended frequently with well marked rigors, febrile paroxysms, and intermissions closely resembling ague; I mean internal suppuration, and local inflammation without suppuration. Practical physicians are fully aware of this circumstance, *but there is another condition of the system in which symptoms simulating ague arise, totally unconnected with inflammation,* and of which I have seen two remarkable examples. They both occurred in females. One, a lady of a nervous temperament, in about a fortnight after her confinement, was affected with well marked symptoms of quotidian ague, which grew worse and more violent during the exhibition of very large doses of sulphate of quinine, but she rapidly got rid of her complaint when, at my suggestion, camphor, aromatic spirit of ammonia, &c., were substituted in its place. In another lady, symptoms of tertian, and afterwards of double tertian, had continued for many weeks, and had reduced the patient extremely, sulphate of quinine, arsenic, and opium, had successively received a fair trial, but in vain. The disease, however, finally yielded to the exhibition of diffusible stimulants, used in combination with *antacids.*

I cannot point out how such cases are to be distinguished from ague, except it be by the failure of the sulphate of quinine. From local inflammations and suppuration they may in general be distinguished with facility. I may here observe, that, in a gentleman treated by Dr. Marsh and myself, violent symptoms of ague depended in the presence of a number of *very small* abscesses in the liver. Here sulphate of quinine given in *lavements*, caused a cessation of the rigors, but *did not diminish the other symptoms of fever;* on the contrary, had it been persevered in, the intermittent would have been evidently converted into a continued fever.

The influence of sulphate of quinine in preventing rigors, even where it cannot remove the cause of constitutional irritation, is well illustrated by its effects where the symptoms depend on stricture of the urethra; and ought to be recollected by every practitioner, lest he be misled occasionally by this partial improvement into an injudicious continuance of the mecine. To conclude my remarks on this powerful remedy, physicians generally prescribe it in too large quantities, also in chronic diseases. Where it is intended to act as a *tonic*, I am persuaded that the dose should never exceed half a grain three times a day, and generally even smaller quantities are sufficient; when a combination of tonic and purgative medicines is required, all our intentions may be answered by a combination of sulphate of quinine in proper quantity, with the compound extract of colocynth, or the pilul. aloes cum myrrhâ.

EXTERNAL APPLICATION OF NARCOTICS.

In June 1831, a lady consulted me for a very severe headach, which came on at uncertain periods, and then continued one or even several days, during which time the agony was occasionally intense. She often passed sleepless nights, but although necessarily exhausted by so much suffering, her general health is tolerable, and during the intervals between the pa-

roxysms, she is active and in good spirits. Usually the pain comes on at a certain hour in the evening, continues during the night, and diminishes about the same hour in the forenoon, but at times the pain continues for several days without any appreciable intermission. As she is of a bilious habit, I attempted the cure in the first instance by emetics, followed by purgatives, and finally by tonics, but without producing the least benefit. Carbonate of iron, sulphate of quinine and arsenic, were successively tried in vain. At last being sent for to see her in one of the violent paroxysms, I directed the scalp to be well steeped, and a narcotic plaster to be afterwards applied. I should have mentioned, that the hair had been frequently shaved for the purpose of trying tepid shower baths, and that she never complained of tenderness in any part of the head, or even the feeling of external soreness, the sensation of pain being constantly referred to an internal headach. These circumstances were very unpromising, so far as regarded the probability of her receiving relief from the external application of narcotics; and to tell the truth, when I ordered the plaster, I myself did not expect much advantage from its use; and yet, strange to say, this method proved most effectual, as the pain immediately disappeared, and did not return for seven weeks.

She wore the plaster for a month, and when the pain returned, a second plaster again banished it. The following is the formula for this plaster:—

℞ Opii pulv. ℈ ii.
Camphoræ ʒ ss.
Picis Burgund.
Emplast. Lithargyr. āā q. s. ut ft Emplastrum.

The quantity of narcotic ingredients given in this formula, is sufficient for the largest sized plaster, for smaller they must be proportionally diminished; such plasters are of great service in rheumatic and neuralgic pains of the chest, back, loins,

and occasionally they prove useful in sciatica; in the advanced stages of phthisis, much suffering is frequently produced by stitches, soreness, and pains in the sides and chest; in such cases, I always direct the part to be well stuped, and then rubbed with warm laudanum; this will very often procure immediate relief, but if it does not, we must apply a few leeches, and favour the flow of blood by the application of a cupping glass, occasionally a very small venesection is necessary, and the application of a small blister to the painful part. Those who have not been engaged in practice, will perhaps expect directions to enable them to distinguish which of these modes of treatment is suited to any particular pain. The pain of *pleurodyne* they will say is to be treated in one way, and that of pleurisy in another: now in the advanced stages of phthisis, it so happens, that the pleuritic affection occupies so small a space in most cases, that it cannot *a priori* be detected by the usual means of percussion and auscultation, and consequently we must try the remedies I have mentioned, in succession; indeed I have seen laudanum and anodyne plasters succeed, where others believed that severer applications would have been necessary. In *crick of the neck,* diligent friction with laudanum affords immediate relief.

(*To be continued.*)

Art. XIII.—*A Case of Diseased Heart, accompanied by Angina Pectoris, exemplifying the Effects of the Hydro-sulphuret of Ammonia.* By Andrew Newton, Esq.

————, ætat. 34, applied for my advice in October, 1830; he was a middle sized man, well made, his countenance was sallow, and lips livid: he stated that his health had always been good until about eight years ago, when he became affected with palpitations; headach, throbbing in his ears, and before his eyes; at this time, he had been in the habit of sitting up at night, to

a very late hour, and taking large quantities of very strong green tea. On his adopting regular hours, and giving up the use of tea, those symptoms in a great measure subsided, although they never completely disappeared. After the lapse of three years, whilst in a situation where he had a great deal to do, the palpitations became more troublesome, and were now accompanied by a sensation of pain, and oppression in the epigastrium; this usually lasted for two or three minutes. Neither the palpitations, nor those attacks of pain and oppression were so severe as to cause much annoyance, until two years more had passed over. At this time he was living as valet to an invalid, and being obliged to sleep in the same room with him, was frequently awakened by his master calling to him in a very loud voice; when thus suddenly roused from sleep, his heart palpitated violently, and a more or less severe attack of the painful sensation in the epigastrium came on; even in the day-time any unusual exertion or agitation was sufficient to produce these effects;* in addition, he now became affected with dizziness, and throbbing in his head, these symptoms yielded to the use of digitalis and copious venesection.

Seven months previous to my seeing him, he had an attack of pleuritis, during which the palpitations were very violent and distressing; the inflammation was subdued by the usual treatment, but since this time, the palpitations have been more violent, and the paroxysms of pain much increased in frequency and duration, coming on every morning immediately upon getting out of bed, and usually continuing for about five minutes;

* At a subsequent period, I had several opportunities of witnessing those attacks; on their approach he stood up and threw back his shoulders, his face was covered with perspiration, and expressive of great agony, neither the pulse nor the respirations were altered in character or frequency. He said that the pain, which was very intense, commenced at the epigastrium, whence it advanced upwards along the chest, and down the arms, till it reached the ends of his fingers, and then gradually subsided. These attacks were frequently terminated by eructation. He said that these paroxysms were much milder than those which he had at night.

they also frequently occurred during sleep, obliging him to start up and remain in the sitting posture until they had subsided. The slightest irregularity in diet, the use of any stimulant, running up stairs, or any mental agitation, brought on a paroxysm : whenever he was out of employment, all these symptoms were much more troublesome than at other periods.

I first saw him early in October ; at this time his countenance was sallow ; his lips livid ; there was no emaciation. On exposing his neck and chest, the entire of the anterior wall of the thorax was seen elevated by each stroke of the heart ; there was also a strong epigastric pulsation; the carotid and subclavian arteries throbbed violently. On applying the stethoscope over the region of the heart, the head was elevated by each cardiac impulse. The pulsations were irregular and intermitting. A very loud *bruit de soufflet* was heard, resembling the sound produced by a spinning wheel whilst in rapid motion ; this sound accompanied both the auricular and the ventricular contractions, it was more marked at the left, than at the right side, but was distinctly audible over the entire chest ; the respiratory murmur was every where natural, but feeble, and marked by the *bruit*. On examining the carotid, by means of the stethoscope, a loud and very distinct *bruit* was heard, differing however in character from that which existed at the heart, it was accompanied by a strong impulse ; this phenomenon was observable, not only in the carotid and large arteries, but even in their minute ramifications, thus it was very apparent even down to the ends of the fingers. His pulse was full, hard, and intermitting, 88 in the minute. On comparing the pulse at the wrist, with the pulsations at the heart, the interval between them was much more marked than in health ; the frequency of the pulse was not altered by change of posture ; his appetite was bad ; his bowels confined, and he was much troubled by flatulence.

I now gave him some aperient medicine which relieved him, and on the 12th of October, saw him along with Dr. Marsh, who suggested the propriety of trying the effects of the hydro-sulphu-

ret of ammonia. I accordingly ordered him to take ten drops twice a day in a tumbler of water; this was increased gradually until it amounted to 35 drops twice in the day. Under this treatment, the action of the heart, in the course of ten days became much diminished, the pulse fell to 48, and became much less full, hard and intermitting, the paroxysms of pain and suffocation now only returned twice in the twenty-four hours; the *bruit* in the arteries was much less apparent; his general health also improved; his appetite returned, and his bowels became more regular; the secretion of urine was considerably augmented. When he had been taking the medicine for a fortnight, he complained of nausea and headach after each dose. It was now omitted for three days, and then resumed in doses of ten drops three times a day; he continued to take it in this manner for two months, during which time the attacks occurred but rarely, and never except when he was agitated, or obliged to exert himself more than usual; when they did appear, their duration and severity were much diminished. The medicine was omitted, and he remained in tolerable health during the ensuing three months. He now became less attentive to his diet, and the paroxysms returned; the use of the medicine was resumed with equal beneficial effects, as when first administered. During the next two months, he was nearly free from any return of the paroxysms.

I now lost sight of him until July last, when he sent for me to attend him during an attack of cholera, from which he recovered in a few hours; he stated to me that he was earning a precarious subsistence as a supernumerary waiter at different hotels, and that the paroxysms had become more frequent and severe.—I saw him again on the 8th of February, when I found him considerably altered for the worse, he was labouring under an acute attack of bronchitis; his respirations were hurried, his pulse 96, strong, full, and intermitting; the paroxysms were frequent and very severe; the action of the heart was very violent; his lips livid, and lower extremities anasarcous; urine scanty.

He stated that since I last saw him he had endeavoured as long as possible to bear up against the disease, but at last was obliged to apply for admission at Sir Patrick Dunn's Hospital. Whilst there, he derived considerable relief from the treatment adopted; this consisted principally in the use of digitalis, frequent bleedings, the insertion of an issue over the heart, with the use of various diuretics to remove the anasarca. Immediately after his discharge, he caught cold. By means of a small bleeding, the application of a blister, and the internal administration of calomel, digitalis, and squill, the bronchitis was completely subdued. Various combinations of ammonia, æther, assafœtida, and opium, with different aromatics, were tried as antispasmodics, in the hope of relieving the paroxysms, which were very severe, frequent, and prolonged. The use of those remedies being productive of but slight benefit, I determined again to resort to the use of the hydrosulphuret of ammonia. I was deterred from ordering this earlier, by his stating that it had been used at Sir Patrick Dunn's, and had produced such nausea, that it could not be persevered in; thinking that this might have arisen from its not having been sufficiently diluted, I desired him to take three drops three times a day in a tumbler of water; finding that this agreed with him, he increased the dose to ten drops. On the fourth day from that on which he commenced the use of this medicine, I found him to all appearance much improved; he had passed a tranquil night; the paroxysm was less severe than it had been for many nights past; the action of the heart was less violent; the flow of urine increased, and the swelling of his legs so much diminished as to allow him to get on his boots. He wished to go out to transact some business, this, however, I forbad; he continued thus well during the entire day, ate his supper, and went to bed; about two o'clock at night he had a very severe paroxysm, which lasted for ten minutes, and terminated in death.

Dissection; eight hours after death.—Some emaciation, the anasarca of the lower extremities had nearly disappeared.

On opening the skull, a considerable quantity of transparent colourless serum was found at the base of the brain, and in the ventricles, the brain and its membranes were healthy.

Chest.—About a pint of straw coloured fluid was found in each pleura, and about four ounces in the pericardium, the left lung was united to the ribs by some old bands of adhesion, both lungs were edematous, but did not present any other lesion. On opening the pericardium, the heart was found enormously increased in size, this enlargement was principally at the left ventricle, the parietes of which were very much thickened, the cavity was not much larger than natural, the right ventricle was dilated, and its parietes slightly hypertrophied, the auricles were healthy, no valvular disease could be detected either in the heart or arteries, there was a very slight atheromatous deposit in the aorta immediately beyond the semilunar valves. The arteries of the neck, chest, and abdomen, presented no lesion of structure.

There was some serous effusion in the peritoneum, the abdominal viscera were healthy.

The heart has been deposited in the Museum of the Royal College of Surgeons.

Remarks.—In this case the headaches,* palpitations, and violent and irregular action of the heart and arteries, made it at least probable, that the patient laboured under organic disease of the heart; auscultation and percussion put this beyond a doubt. It is true, we may have violent cardiac action, bruit de soufflet, and even angina, without organic disease, but in no case will we have violent cardiac action, combined with *constant* bruit, unless there be some organic lesion.—It is difficult to account for the *bruit* in this and similar cases; no doubt it is a frequent,

* The headaches, I should imagine, evidently depended upon the state of the heart; indeed these two states are so frequently connected, that whenever I am consulted about pain in the head, I seldom omit making an examination of the state of the heart; this is the more necessary, as in very many instances of heart disease, pain or uneasiness in the head is the only symptom complained of.

almost a constant* attendant upon valvular disease, yet it is not unfrequently found in cases where the valves are perfectly healthy, and in which no organic disease of the heart or arteries can be detected, either during life or on the most minute investigation after death. From the examination of a considerable number of cases during life, compared with the appearances observed on dissection, I have come to the conclusion, that a "*bruit*" when permanent and combined with other anormal cardiac symptoms, is invariably pathognomonic of organic disease.

I shall not enter into the question, as to whether this remarkable phenomenon be attributable to spasm, as was supposed by Laennec, or be purely mechanical, as asserted by Dr. Corrigan; further researches are requisite to enable us to determine whether either of those suppositions be correct.

This is one out of a multitude of instances, which might be adduced to exemplify the influence exerted by the nervous system upon organic disease. Here it is doubtful, whether or not the high state of nervous excitement gave rise to the organic lesions, but it is certain, that it was during this state that the symptoms first manifested themselves, and that every subsequent excitement or depression increased the violence of the symptoms, and gave new impulse to the disease; hence, we must carefully avoid every thing calculated to disturb the nervous system, and, whilst endeavouring to lower the circulation, we must allay all nervous irritation. If our attention be merely directed to the former, our object will be defeated, hence, the injurious effects of Valsalva's mode of treatment; by this means, no doubt, the pulse is lowered, but the system is also debilitated, the relief afforded is only temporary, the nervous symptoms are much increased, and thus the sufferings of the patient are abridged rather than alleviated. A

* In case of valvular disease, whether in the heart or aorta, the bruit may disappear when the circulation has been much lowered, but even in this case it can be easily re-produced, by causing the patient to make any exertion, such as walking across the room, or running up stairs.

too rigid adherence to antiphlogistic treatment, will soon convert active into passive dilatation, and accelerate the occurrence of dropsy; venesection now merely diminishes the volume of blood for a short time, and thus affords temporary relief, but after each repetition the blood becomes more and more serous, and should bleeding be discontinued, sudden and fatal effusion will take place into the brain or thorax. On this account, it is advisable to have recourse to bleeding as seldom as possible, and whilst the use of stimulants is strictly forbidden, a moderate use of nutritive food should be allowed.

Whilst upon the subject of diet, it may be mentioned, that every thing calculated to produce flatulence must be strictly prohibited, as this is a most troublesome and constant complication in cardiac disease.

Many objections apply to the treatment by digitalis; it is always a dangerous and often an uncertain remedy, and even in these cases in which it succeeds best, it soon loses its efficacy; its tendency to disorder the stomach is often such as to forbid its employment, it was therefore a great desideratum in medicine, to devise some plan of treatment which would lower the circulating system without producing permanent debility. Judging from the accounts which Cruickshanks and Rollo have given of the effects of hydrosulphuret of ammonia, it appeared to Dr. Marsh and me, that it might be advantageous in this case, particularly, as here, the angina seemed to depend upon organic disease of the heart; I tried it, and the event far surpassed our most sanguine expectations. Whilst the patient was upon meat diet and attending to his occupations, the action of the heart was lowered; the paroxysms of angina diminished in frequency, severity, and duration, and for a time were completely suspended; his general health also improved, and I may remark here, that his appetite instead of being destroyed, as is stated by Cruickshanks and Rollo to be the effect of this remedy, was, on the contrary, increased. With regard to the nausea which it produced when given in Sir Patrick Dunn's Hospital, I cannot help supposing, that this was attributable either to its not

having been sufficiently diluted, to its having been exhibited in too large doses, or to some error in its preparation; any of those causes will produce this effect.

Whilst upon this subject, I may mention, that this medicine has been repeatedly tried, both by Dr. Marsh and myself in various diseases, principally cardiac and cutaneous, in all it produced a powerful effect in lowering the pulse, the appetite was increased, and also the secretion of urine; in some cases where it was not sufficiently diluted, it produced nausea, head-ach and giddiness, these disappeared on omitting its use for a short time, and then giving it in a less concentrated form.

From the trials which have been made of this medicine in cutaneous diseases, there is reason to hope, that it may be found to possess some value in the treatment of this class of complaints.

In consequence of the tendency which the hydrosulphuret of ammonia has to undergo decomposition, it should always be recently prepared and kept in a dark place; when used, it should be given by drops, in preference to prescribing a draught or mixture.

Art. XIV.—*Contributions to Pathological Anatomy.* By Richard Townsend, M. D., M. R. I. A., Fellow and Censor of the King and Queen's College of Physicians, Senior Medical Inspector of the House of Industry, Lecturer on Pathological Anatomy, &c.

Case I.—*Sudden death. Spontaneous rupture of the heart.*

The body of a very old woman was brought into the dead room of the Whitworth Hospital, for anatomical examination, on the 30th of August, 1830. The external appearance of the body did not in any respect indicate previous disease; on removing the sternum, the pericardium appeared unusually prominent, and of a bluish white colour. When opened, it was found to contain more than half a pint of dark clotted blood,

which completely enveloped the surface of the heart. When this coagulum was removed, the heart appeared of its natural size, but was enormously laden with fat, especially at its basis and over the right ventricle. On the anterior surface of the left ventricle near its septum, and at the distance of about an inch from the apex, a longitudinal fissure, half an inch in length, was discovered, the edges of which were jagged and had evidently been separated by tearing; there was a slight degree of ecchymosis under the serous membrane, in the immediate neighbourhood of the wound. On laying open the left ventricle, it was found that the fissure seen on the external surface extended through the fat and muscular substance, into the interior of the left ventricle. This cavity was quite empty, all its blood having previously escaped through the wound. The length of the fissure on the internal surface of the ventricle, was somewhat greater than on the external surface, but corresponded with it exactly in other respects, being a mere cleft or chink just wide enough to admit the handle of a scalpel. The lining membrane in the neighbourhood of the rupture was soft and friable, and the columnæ carneæ, for about the circumference of a shilling, were of a dull white colour, and so soft as to break down under the scalpel. The left ventricle was of its natural dimensions, and its parietes of their ordinary thickness, but the muscular fibres were pale, soft, and flabby. The other cavities of the heart presented their usual appearance, except that the muscular walls of the right ventricle were as thin as paper, and coated with a layer of fat nearly half an inch deep. The valves were all remarkably healthy for a subject so far advanced in life. The coronary arteries exhibited several patches of atheromatous deposit, sufficient in many points to diminish their calibre considerably. The arch of the aorta was dilated and atheromatous. The other viscera were all healthy, and the muscles of the trunk and extremities appeared even more firm and florid, than is usually observed in persons of her great age.

Upon inquiring into the previous history of this individual, it was ascertained that she was ninety years of age, and had been a servant in the house of industry for many years, her usual occupation was that of scouring the floors, she always enjoyed excellent health with the exception of an occasional slight cough. In her 88th year she fractured her thigh near the trochanter, but completely recovered from the effects of that accident in the usual time.

On the morning of her death, she went to the chapel in as good health and spirits as usual, and while in the act of saying her prayers, she suddenly dropped down dead without a struggle or a moan.

Case II.—*Sudden death. Spontaneous rupture of the heart.*

Another case of a similar nature to the preceding, occurred in the same establishment on the 5th of March, 1832. The subject of it was a large athletic man, ætat. 84, who had served 26 years in the navy, and after a long life of hardships and vicissitudes, was admitted four years ago into the pauper wards of the House of Industry. During the time of his residence in this establishment, his health was uniformly excellent, with the exception of a slight sensation of uneasiness which he occasionally felt in the left side, in the region of the heart. The night before his death, he complained of a return of this pain, and of difficulty of breathing: next morning these symptoms had totally disappeared, and he got up at his usual early hour, in as good health and spirits as he had enjoyed for many months previously. He went to chapel, walked afterwards in the yard for about two hours, returned to his ward, and while in the act of cutting tobacco at the end of the table, and in conversation with one of his comrades, he suddenly fell down, and expired instantaneously. His family are represented to be remarkably long-lived; there is a sister of his at present in the House of Industry, in her 86th year.

On opening the body, the only morbid appearances were found in the thorax. The parenchymatous structure of the

lungs was rarified and emphysematous, as is usually the case in persons of his time of life. The pericardium was greatly distended, and occupied the principal space of the lower part of the left side of the thorax. On slitting it open, a large quantity of black blood partly coagulated and partly fluid, was found occupying its interior. The heart was rather larger than the fist of the patient, but its increase of size was chiefly attributable to a large quantity of fat which was developed on its surface, principally about the origin of the great blood-vessels and along the septum ventriculorum, in both which situations it measured near half an inch in thickness. The muscular substance of the heart was generally pale, exsanguineous, and flabby; in the right ventricle the walls were as thin as paper, in the left, they retained their usual thickness. The coronary arteries were ossified, and the ossification extended even to the minute ramifications which went to the apex of the heart. On the anterior surface of the left ventricle, about an inch from the septum, and the same distance from the apex, a rupture of the parietes was discovered half an inch long, and several lines wide, this opening was nearly closed by one of the columnæ carneæ, which was torn across and projected through the external orifice. The muscular fibres in the vicinity of the rupture, were in a state of perfect ramollissment, but neither on the external or internal surface was there any unequivocal appearance of ulceration. There were two patches of ecchymosis as large as half crowns, under the serous membrane on the surface of the left ventricle. No other morbid appearances were observed. Not the least remarkable circumstance in the history of these two cases, is the sudden occurrence of the fatal accident in the midst of apparently sound health, not preceded by any premonitory symptoms, or brought on by any moral emotion, or physical exertion. But though there were no evident symptoms of organic disease manifested during life, there was abundant evidence, on dissection, that the structure of the heart was materially altered from its natural condition. The coronary arteries were exten-

sively diseased in both cases, and the supply of arterial blood which they transmitted, was, consequently, inadequate for the due nutrition of the muscular fibres of the organ, which were accordingly soft, pale, and flabby; and as usually happens in such cases, an inordinate quantity of fat was deposited on the surface of the heart, as if to compensate for the atrophy of its muscular substance.

In the greater number of cases where rupture of the heart has been observed to occur, it has been immediately preceded by some moral emotion, or physical exertion, or concussion, as its immediate cause, to which the accident is generally attributed. Nichols, who gives a very clear and succinct account of the rupture of the heart, which caused the death of George the Second, attributes the accident to the efforts made while straining at stool.—*Phil. Trans.*, vol. lii. part 1.

A similar accident terminated, not long since, the existence of a late eminent Barrister of this city. Bertin mentions a case of rupture of the right auricle, caused by falling out of a window; and Haller and Morgagni have known the heart ruptured during violent paroxysms of pain, and the convulsions of epilepsy. These causes, however, can scarcely be conceived sufficient to produce such a formidable effect, unless where the organ was predisposed to rupture by some preceding lesion, and where such predisposing cause is strongly marked, the ordinary force of the heart's contractions may be sufficient to determine its rupture, as in the present instances.

From the reports which have hitherto been published of this fatal accident, it appears that the true cause of the rupture is most commonly attributable to the parietes having been previously eaten away to a certain depth, by ulceration. The ulcerative process may commence either at the external or internal surface of the heart, or may attack both surfaces at the same time, and continue to burrow until both ulcers meet, and so complete the perforation. This species of rupture may be con-

sidered analogous to the perforation of the stomach and intestines, from the successive ulceration of their coats.

Andral mentions, in his Treatise on Pathological Anatomy, that the French Pathologists generally enumerate the excessive deposition of fat on the surface of the heart, among the causes which predispose to its rupture; but this opinion, he conceives, should receive further confirmation before it is finally adopted, as the only case in point to establish the fact, is that related by Dr. Gratiloup, of Bourdeaux, in the Archives Generales, for 1822, of a curate of that town who died suddenly in his bed of rupture of the right auricle, the heart being at that time *prodigiously laden with fat.* The case which I have related, would seem to support the doctrine that the excessive deposition of fat on the surface of the heart, especially when accompanied, as it usually is, by atrophy and softening of the muscular fibre, may render it susceptible of being easily torn and ruptured. But even admitting this supposition, it still remains to be explained why it is not in the auricles, or in the right ventricle, where the muscular parietes are thinnest, and the fat most abundant, that the rupture generally occurs; but about the middle of the left ventricle, where the fat seldom accumulates in any great quantity, and the muscular coat is particularly thick and strong. This circumstance would seem to prove that the rupture of the parietes in these cases, should not be regarded as a mere mechanical effect produced by their over-distention, but rather as an active process in some degree analogous to the rupture of the uterus, from excessive contraction of its fibres.

Perforation of the heart, from whatever cause it proceeds, is generally followed by immediate death. Bertin states, that of ten cases of this accident, eight died instantaneously, and the other two after a few hours. The extent of hæmorrhage into the pericardium, cannot account for these fatal consequences, as the quantity of blood effused is often very trifling. The great and sudden shock which the nervous system sustains, is more probably the immediate cause of death. In some

rare cases, doses does not take place for several days after the accident. It is stated, that in these cases, the perforation has been found plugged up with a coagulum of fibrine.—*Andral.*

Case III.—*Death occurring suddenly with convulsions. Transverse rupture of the inner and middle coats of the ascending portion of the arch of the aorta.*

Mary Holland, æt. 36, inclined to corpulence, has been subject to occasional attacks of dyspnœa, and palpitation, for the last five years; they have latterly become much more frequent, and are always aggravated by exertion, fits of passion, or excess in eating or drinking. She does not recollect the precise period of their invasion, as they were at first so slight, as scarcely to attract attention. Three days previous to her admission into the Whitworth Hospital, she was seized, after exposure to wet and cold, with rigors, cough, pain of chest, and violent oppression. On the day of her admission, she presented the following symptoms: countenance suffused, and of a dusky red colour; respiration hurried and laborious; dull sense of pain all over the chest; short single cough, with scanty viscid expectoration; pulse 100, irregular, occasionally intermitting; tongue furred at the centre, scarlet at the tip and edges; thirst; anorexia; no pain on pressure of epigastrium. On examining the thorax, the sound, on percussion, was found rather dull all over the chest, but much importance could not be attached to this sign, in consequence of her obesity. A dry crepitating râle was heard both before and behind over the lower half of each lung. The heart's action was tumultuous, and extremely irregular, conveying to the ear a tremulous sensation, similar to what is felt when lying on the deck of a steam-boat that is shaken by an engine of great power, or to the confused din and vibratory motion experienced when standing on the loft of a water-mill. The force of the impulse scarcely exceeds the natural standard, but occasionally the left ventricle strikes the chest with considerable force. The double sound of the heart is changed into a prolonged murmur, as if a file working back-

wards and forwards on a piece of wood. Above the clavicles this sound is also heard, but apparently at a distance, and in a subdued tone.

In consequence of the combination of double pneumonia with organic disease of the heart, the prognosis was extremely unfavourable. Bleeding from the arm, and full doses of emetic tartar, were prescribed.

Next day. Breathing rather less laborious; other symptoms as before. In the lower lobe of the left lung, bronchial respiration had taken the place of the crepitating râle, indicating the passage of the pneumonia, into the stage of hepatization. 12 grains of tartar emetic to be taken in the course of the day.

Next day. Countenance less agitated; respirations 26 in the minute; cough softer; expectoration more copious, and less like a solution of gum; pulse continues rapid, and irregular; no change in the stethoscopic sounds. In about an hour after the visit, while in the act of turning in bed, she was seized with violent convulsions, which continued about three minutes. On recovering, she exclaimed that something had burst within her chest; almost immediately, a second attack of convulsions succeeded, followed as quickly by a third, during which she expired.

Dissection, twelve hours after death.—The contents of the cranium appeared perfectly healthy, with the exception of a slight degree of congestion in the superficial vessels of the brain.

The lower lobe of the left lung was perfectly hepatized, and the lower and middle lobes of the right lung were slightly crepitous to the feel, and when cut, exhibited a brilliant red colour, and exuded a small quantity of frothy red fluid. The right auricle, and ventricle of the heart, were considerably dilated; their valves and muscular parietes appeared quite healthy. The left auricle was slightly dilated, and its parietes so thickened, that they did not collapse when divided; several of the musculi pectinati were as large as goose quills.

The zone of the left auriculo-ventricular orifice, was cartilaginous, and to one side of it was attached a warty excrescence, as large as an almond, which projected into the auricle. The mitral valves were extensively diseased, and reduced the orifice to a mere crescentic chink. The chordæ tendineæ were unusually thick, and of a dull white colour. The columnæ carneæ, into which they were implanted, were also very much hypertrophied. The left ventricle was dilated, and its walls nearly twice as thick as natural. The aortic valves were surrounded each at its basis by a semicircle of bone, and their free margins were thickened, semicartilaginous, and curled upon themselves, so as to leave a very narrow aperture for the passage of the blood. A superficial ecchymosis, of the size of a shilling, was perceived on the outer side of the ascending arch of the aorta. On slitting open the vessel, it was discovered that the inner and middle coats, which were both extensively diseased, and exhibited several patches of calcareous incrustation, had been ruptured transversely, for an extent of at least an inch and a half, immediately below the origin of the arteria innominata, and underneath the superficial ecchymosis previously noticed. The inner coat was torn irregularly, and did not correspond exactly with the rent in the middle tunic, which was transverse, and apparently produced by the separation of its fibres. The external coat was not ruptured, nor separated from its connections with the middle tunic, except in the immediate neighbourhood of the rupture. The quantity of blood effused in the ecchymosis, could not exceed half a tea-spoon full.

In this case, the rupture of the aorta was the only anatomical lesion to which the immediate cause of death could with any probability be referred; it is evident that this accident could not have preceded the fatal catastrophe many minutes, as otherwise the impetus of the column of blood projected by the heart, and striking directly against the cellular tunic of the aorta, must have protruded that yielding membrane into a pouch, as in the ordinary formation of false aneurism, or at least

have detached it to some extent from its connexion with the middle arterial tunic, as in the remarkable case of rupture of the inner and middle coats of the aorta, related by Laennec, vol. ii. p. 700, where the blood insinuated itself between the middle and outer coats of the vessel, dissecting them asunder from the arch of the aorta to its bifurcation at the iliacs. In the present case, there was scarcely any effusion of blood, but the shock which the nervous system sustained from such an extensive injury of the circulating system, the central organ of which was previously in so very diseased a condition, is quite sufficient, I conceive, to account for the fatal consequences that ensued.

Case IV.—*Aneurismal tumour as large as a hen-egg, on the anterior surface of the arch of the aorta, composed of a fibrinous coagulum, and situated between the external and middle coats of the vessel.*

The signification of the term aneurism, is still so undefined, that I scarcely know whether I am guilty of a misnomer in applying it to the following morbid condition of the arch of the aorta, which, as far as I have been able to ascertain, has not been described by any pathologist.

William Hogan, a middle-aged man, of short stature and robust frame, was admitted into the Whitworth Hospital, with violent palpitations and extreme dyspnœa. These symptoms commenced almost imperceptibly about three years ago, and each succeeding winter they have been progressively aggravated. At the time of his admission, the pulsations of his heart were so violent, as to throw nearly the whole anterior surface of his chest into vibratory motion, visible at a considerable distance from the bed. Pulse at the wrist 110, strong and vibrating. Carotid and temporal arteries pulsate violently. Respiration hurried, laborious, and accompanied with a wheezing sound. Decubitus impossible.

Auscultation.—*Sound on percussion* generally obscure: over the cardiac region it is perfectly dull. All over both lungs

a mixture of the sonorous and subcrepitous râles is heard. Impulse of the heart unusually strong, especially over the left ventricle; the impulse is also felt powerfully above the clavicles, where it is accompanied with a loud bellows' sound, which becomes less audible as the stethoscope is moved down the sternum.

His respiration continued to become more embarrassed until the time of his death, which occurred in about three weeks after his admission into Hospital.

Dissection made eighteen hours after death.—Lungs generally congested, bronchial membrane of a deep violet colour. Heart greatly increased in size, both auricles somewhat dilated, as was also the right ventricle, which lay quite flaccid on the septum; the latter measured fully one inch in thickness, and the other parietes of the left ventricle were proportionably hypertrophied. On examining the arch of the aorta, a hard solid tumor of the size and form of a large hen-egg was observed on its anterior surface, near the origins of the left carotid and subclavian. On slitting up the aorta, it was seen that this tumor, which projected considerably into the interior of the vessel, was situated between the outer and middle coats of the artery, both of which appeared perfectly sound, and shewed no mark of any solution of continuity. On making an incision into the tumor, it was found to consist of a solid mass of fibrine, of a pale yellow colour; its surface only being stained with the colouring matter of the blood. It was evident, therefore, that this tumor was formed of a coagulum of blood, and was situated between the external or cellular, and the middle or fibrous arterial tunics.

Its presence in such a situation, could, I conceive, only be accounted for on the supposition of its being caused by hæmorrhage from the vasa vasorum, which are usually of considerable size in that neighbourhood. It certainly could not be considered as an instance of a spontaneous case of aneurism, as though the aorta was slit open and examined most carefully, no

trace could be found of any communication having ever subsisted between the cyst and the interior of the vessel.

The only analogous case that I am acquainted with, is described by Corvisart, page 312, " Essai sur les maladies du cœur." This celebrated anatomist and physician, found a firm solid tumour as large as a walnut, intimately attached to the coats of the aorta. This tumour was enveloped externally by a fibrous membrane two lines in thickness, and contained a substance precisely similar to the fibrinous coagula that are found in old aneurismal pouches. Though the aorta was examined most closely, no communication whatever could be discovered between the tumour and the interior of the vessel, but a grey livid spot was seen corresponding to the base of the cyst. The same appearances were likewise observed in a second case, M. Corvisart declines offering any opinion on the mode of formation of these tumours, further, than that they were first extraneous to the coats of the vessel, and subsequently eat their way through the outer tunics by a sort of chemical process; and he supposes, that they might eventually occasion the formation of aneurism, by perforating the inner coat of the vessel. " Je suis tres disposè a croire qui les tumeurs qui avaient déjà usè une grande portion de l'epaisseur des parois de l'aorti et *alterè la coleur de sa membrane interne* auraient fini par percer tout à fait cette artere."

I shall not pretend to determine, whether the tumours described in this passage are of the same nature, and formed in the same way, as in the case which I have related; Mr. Hodgson* regards them as instances of aneurism cured, the sac having been filled up with lamellated coagula, and the volume of the tumor diminished by absorption: but this opinion, which has been copied by most subsequent writers, is quite irreconcileable with Corvisart's express statement of the inner membrane being

* Diseases of Arteries, page 127.

perfectly continuous under the tumors, and only altered in its colour.

Whether the distending force of a coagulum of blood effused by the vasa vasorum, between the coats of an artery, may in those cases, where the inner and middle coats of the vessel are much diseased, cause the rupture of the diseased coats, and so lead to the formation of an aneurism from without inwards, according to the idea of Corvisart, is a question which must be decided by future observations.

Case V.—*Death from asphyxia, caused by large tuberculous masses developed in the parietes of the left auricle, compressing the trunks of the pulmonary veins, so as to reduce their diameter to that of a crow quill, thereby preventing the return of the blood from the lungs.*

John Larkin, a poulterer, æt. 62, states, that he has occasionally suffered from cough and shortness of breathing for several years past, but that he never felt seriously ill until about twelve months since, when, after putting on damp clothes, he was seized with cough, dyspnœa, palpitations, and profuse hæmoptysis; for these symptoms he was bled copiously; the hæmoptysis ceased after the second week, and has not since returned; the cough likewise abated considerably, but the palpitations and dyspnœa continued to recur at irregular intervals throughout the remainder of the winter and spring; during the summer months he was so much better as to resume his ordinary occupations, but since the commencement of the present winter (1829,) his breathing has become habitually short, and at times has been so oppressed for hours together, as to make him suppose each succeeding gasp must be his last; states, that these violent paroxysms are brought on by changes of weather, flatulence, or mental vexations; but never had chills, night-sweats, nor diarrhœa.

The following is a summary of the principal symptoms which he presented during his stay in the Whitworth Hospital,

to which he was admitted on the 18th of December, 1829. He was excessively emaciated, and was constantly annoyed with a short, dry, harassing cough, his breathing was extremely variable, and as he himself remarked, materially affected by the state of the weather; during the two or three frosty days that occurred in the first week of January, he was so well as to walk down stairs and take several turns in the garden, but during the damp weather which succeeded, his breathing was frightfully oppressed in paroxysms, resembling the most violent attacks of spasmodic asthma. His pulse was never less than 100 in the minute, weak, compressible, and regular. The heart's action, as heard by the stethoscope, was extremely feeble, and could with difficulty be heard fluttering faintly, and apparently at a great distance behind the sternum; in the epigastrium its action was rather more perceptible, but its sound and impulse were so excessively feeble and indistinct, that it was impossible to analyze them. The sound on percussion was remarkably dull all over the thorax. During the last fortnight of his existence, no respiration whatever could be heard in any part of the left lung, in the right it was puerile for about two fingers' breadth under the clavicle, lower down it was extremely feeble, and almost completely marked by a subcrepitating râle. At this period he was obliged to sit bolstered up with pillows, and had regularly a frightful paroxysm of suffocation at midnight: his strength now failed him completely; his face assumed a livid cadaverous aspect; his ideas wandered, and became incoherent; and he died asphyxiated about five weeks after his admission into hospital.

Of all the remedies which were employed, blood-letting alone seemed to afford him even temporary relief, but the smallest abstraction of blood, was, latterly, followed by such extreme prostration of strength, that its employment was renounced altogether. Antispasmodics and counter-irritants seemed to produce no effect whatever on his symptoms.

On dissection made twelve hours after death, a considera-

ble quantity of serous fluid was found effused on the surface of the brain. On opening the thorax, the lungs appeared to fill the cavity completely, the superficial cells on their anterior surface were considerably dilated, laterally and posteriorly, the lungs at each side were firmly attached to the costal pleura, the medium of attachment was of the colour and consistence of cartilage. On removing the lungs from the chest, they appeared externally of a dark red colour, conveyed a distinct sense of fluctuation to the finger, and felt remarkably heavy. When the left lung was cut into, an immediate gush of blood followed, as if the incision had been made into an aneurismal sac. The quantity of blood which escaped could not be less than three pints and a half; after it had been removed, the pulmonary veins from which it flowed, were seen traversing the parenchyma of the lung, dilated to at least four times their natural size; those veins which are naturally no bigger than crow quills, being as large as the fingers of a glove. On tracing the dilated veins towards the root of the lung, the dilatation was found to extend uniformly from the smallest branches to the main trunks, which formed two large sinuses outside the left auricle. The right lung presented a similar appearance, but in a minor degree. On examining the heart, the dilatation and congestion of the pulmonary veins were found to arise from the compression which they suffered at their entrance into the left auricle, the parietes of which appeared converted into one solid unyielding mass of tuberculous matter, nearly one inch in thickness; this morbid production was developed between the outer and inner membranes of the auricle, and by the pressure which it made on the pulmonary veins, diminished their calibre so much, that a probe could with difficulty be passed through them into the auricle. The consequence of this constriction of the veins at their orifice, was, that the blood which was thus obstructed in its return to the heart, accumulated in the trunks and minor branches of the veins in such quantities, as to produce the enormous dilatation of those

vessels which I have endeavoured to describe. The right auricle and ventricle were considerably dilated; the heart in other respects appeared healthy. The bronchial glands were much enlarged, and filled with tuberculous matter. The lungs contained only a few miliary tubercles. The abdominal viscera did not present any unusual appearance.

I have thought this case deserving of being recorded, as it serves to illustrate a morbid condition of the heart and lungs of extremely rare occurrence, and likewise as exemplifying a pathological fact, which I have had repeated opportunities of observing, namely, that a permanent organic lesion may give rise to symptoms of a remittent or even of an intermittent character. In this instance, the mechanical obstruction to the pulmonary circulation, and the consequent congestion of the pulmonary tissue, must have opposed a constant obstacle to the due aëration of the blood, and yet the symptoms of distress were only felt occasionally, or at least were greatly aggravated at intervals. In like manner, I have known aneurism of the abdominal aorta distend the nervous filaments of the solar plexus to such a degree, as to lacerate several of them, and yet the pain experienced in this case occasionally intermitted for whole weeks together.

I have searched in vain in modern authors for the description of a state of the heart and lungs, such as I have recorded; but in Sprengel's erudite History of Medicine, I find mention made of a case almost precisely similar, which was reported by Maurocordatus, a Turkish physician, in the year 1664,* and is thus described by Sprengel (Histoire de la Medicine traduite par A. J. L. Jourdan, tom. iv. p. 129.) "Aux vingt-six raisons qui Maurocordatus allegue en faveur de la circulation pulmonaire, il ajoute encore une observation faite par lui meme sur le cadavre d'un de ses maitres. Cet homme etait mort d'un asthme

* Maurocordat. *Pneumatic. Instrument. circulandi Sang.*—Francof. 1665, cap. 10, p. 81.

suffocatoire, on trouva les poumons singulierement distendus, l'oreillette pulmonaire cartilagineuse, le ventricule gauche vide, mais les veines pulmonaires gorgées de sang; il en conclut que ces dernieres raminent le fluide du poumon." From this description it appears, that not only was the organic lesion similar, but that the symptoms which it produced were likewise those of spasmodic asthma.

Art. XV.—*A Case of Collapse, after Parturition, in which Cold Aspersion was employed with the most marked be efit.* By G. T. Hayden, Esq., Surgeon to the Anglesey Dispensary.

Mrs. M'G., ætat. 26, of an irritable habit, had laboured under mental depression for some time before confinement of this her first child. Having completed the full time, labour commenced with the usual symptoms, on the 29th October, 1831, at 1 o'clock, A. M. A midwife attended; case natural in all respects; the pains did not become very urgent, until 3 o'clock, P. M., on the 30th. The delivery of the fœtus was accomplished in an hour after.

After the birth of the child, she complained of slight pains in the back and lumbar regions, and with each pain there was a gush of blood. Her head became affected, and she was very much agitated, and irritable.

The midwife sent for assistance to the Anglesey Dispensary. Mr. M'Dermot, a senior and very intelligent pupil, immediately attended, and found the patient much exhausted, although the discharge of blood was less than a pint. The placenta had not been expelled. The uterus had not contracted. Pulse quick and small; countenance anxious. The binder was tightened. Clothes dipt in cold water applied to the hypogastrium, and external parts. Wine was given in considerable quantity. The pains in the back continued troublesome, but

they were not attended with discharge. She still became weaker. The uterus contracting, but slightly. The patient sinking.

Mr. M'Dermot now sent for me. I found the patient's danger increasing every minute. Wine and burnt whiskey were administered with an unsparing hand, but they had not at all the effect of rousing the system. I now employed *cold aspersion of the face*, which was almost instantaneously effectual in rousing the patient from a state of awful insensibility, and raising the fluttering and scarcely perceptible pulse. The aspersion was employed with a hearth-brush, first dipped in a basin of cold water, and then shaken suddenly and forcibly over the patient's face, which was immediately dried with a coarse towel after each application.

The patient soon became conscious of the marked benefit to be derived from the remedy, for when sinking into insensibility, she frequently called, or made signs, to be sprinkled, and seemed to be roused, as if from sleep, after each aspersion. On examination, the placenta could be felt near the os uteri, but there was no uterine contraction, until vomiting set in, and then the former was slight. As soon as the stimulating effect of the aspersion had subsided, the state of collapse again and again supervened, with an inclination to sleep; if allowed to doze, her pulse was at first somewhat better, but after five or eight minutes it sunk, and was imperceptible. She would then start wildly, as if escaping from drowning, gasp for breath, and fling her ice-cold and clammy arms about; the ghastly countenance, and pulseless wrist, giving awful and threatening indications of approaching dissolution. After the resuscitating influence of aspersion had somewhat restored her, she complained of a "smothering at her heart, and intolerable sense of faintness," which the wine and other cordials always failed to remove. In fact, the powers of deglutition were often suspended, until restored by cold aspersion. Hot bricks rolled in flannel were applied to her feet; volatile salts held to her nostrils; wine, spirits, and mulled

ale, were given freely, and at short intervals. The aromatic spirit of ammonia was largely given; and lastly, the ergot of rye, to the amount of two drachms in infusion, with a view of exciting the uterus to contract, but without effect. The cordials appeared to be useful in promoting the discharge of flatus from the stomach.

11 o'clock.—My esteemed friends, Dr. Ireland and Mr. Dyas, now gave me their valuable assistance. I had previously emptied the bladder with the catheter. It was determined that the cold aspersion and cordials should be continued, and the following draught administered every fifteen or twenty minutes:

℞ Aceti Opii, gr. viii.
Spirit. Ammon. Aromat. ʒss.
Aquæ Menth. pip. ℥i
Syrupi Aurantii, ʒi. M.

She had five of these draughts, which seemed to compose her in some degree, but she always became excessively weak after dosing ten or fifteen minutes. This could be removed by the cold sprinkling only, which almost immediately had the effect of rousing the system.

The patient continued in this state from 11, P. M., till after 5 o'clock, A. M., when we could perceive some amendment, the collapse not occurring so frequently; the pulse continuing to gain strength. She now slept for half an hour, awoke much refreshed, and said she felt quite strong, took some chicken broth, and again slept.

31st, 12 o'clock, A. M.—Considerable reaction; pulse full; pains in back and loins; uterus contracted. Having drawn off the urine, I withdrew the placenta, which was now partly in the vagina; neither coagulated or fluid blood followed. The after treatment of this case did not present any peculiarity. The urine had to be drawn off once; the patient was kept on low regimen for some days, and the bowels were freely acted upon by the compound rhubarb pill, and the ordinary black mixture.

I shall embrace the present opportunity of making a few brief observations upon two leading features of the foregoing case; remarkable, owing to the sudden and deathlike collapse which supervened upon the delivery of the child, although the loss of blood was not more than usual; and secondly, for the decided influence of *cold aspersion,* in rousing the vital powers, when the strongest cordials had altogether failed to produce this effect.

It is a rule in surgery, and as valuable as it is general, that no operation by which the powers of life may be in the slightest degree weakened, should be undertaken during the depressed state of the system, which exists in *collapse,* and this is uniformly applicable, even without reference to the cause that produced this state. The advantages to be derived from a strict adherence to this maxim, are equally decided in obstetric, as well as general surgery.

In the preceding case, though the quantity of blood lost after the delivery of the child was inconsiderable, yet the state of collapse was awful and dangerous in the extreme, and hence the necessity of abstaining from any act that might increase this state, was decidedly and unequivocally indicated. Influenced by this view of the case, I did not extract the placenta during the truly critical and precarious state of the patient, when the loss of a few ounces of blood, the necessary consequence of the removal of the placenta, might, as I have already seen, cause the sudden dissolution of the patient.

The sentiments of the experienced Denman are truly practical on this subject.*

With regard to *cold aspersion,* the advantages derived from this remedy as a stimulant, were truly pre-eminent, producing resuscitating effects, when all others failed.

Sprinkling the face with cold water, as a preventive of

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* Page 368, E. 6.

puerperal convulsions, was practised by Denman with decided success.*

We have good reason to conclude from the case I have detailed, that cold aspersion may be found equally efficacious in some no less formidable and analogous cases. I am not aware that the stimulating effects of cold (in the case I have mentioned) have obtained a trial in the awful state of collapse which attends the *malignant cholera.* From the decided effects produced by this remedy, when all other stimulants had failed, I am disposed to recommend its trial, as a means of recalling vital energy, in the depressed state of the system attendant on cholera. Beaupué on cold, states (p. 298,) "Stupor of the nervous system, with extreme, but not radical weakness, may prove quickly mortal, if cold, by virtue of its peculiar exciting property, which often succeeds when all other excitants fail, be not employed to recall the departing breath of life."

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* Page 395.

BIBLIOGRAPHIC NOTICES.

Leopoldi Antonii Gölis, M. D., &c., Tractatus de rite cognoscenda et sananda Angina membranacea. *A Treatise on the Diagnosis and Treatment of Croup.* By L. A. Gölis, M. D., Vienna, no date, pp. 176, 8vo.

A monograph on croup, by an author whose treatise upon hydrocephalus was pronounced by a very competent judge to be the best then extant, cannot fail to prove interesting; and as, though many years published, it seems to be quite unknown to the English medical world, we conceive we may fairly consider it as a new work, and treat it accordingly.

Dr. Gölis informs us in his preface, that it was originally written for the prize proposed by Napoleon, for the best Essay upon the subject, but was unsuccessful; and that he was subsequently induced to publish it by the advice of the chief of his medical brethren in Vienna, and the approbation of the celebrated Frank. He adds, that since the adoption in Vienna of the treatment therein described, the mortality of the disease had decreased to such a degree, that scarcely one in fifteen died of it, when medical assistance was called in sufficiently early.

He commences with a general description of the disease, and then proceeds to define it, by its essential characters. After adducing several arguments in support of his assertion of its inflammatory nature, he divides it into four stages, which are merely subdivisions of the two generally recognized by English writers, as will appear at once from their names, viz., the invasive or catarrhal, the inflammatory, the stage of transudation, or formation of the false membrane, and the stage of suffocation. He describes the symptoms of each, but observes, that the first is sometimes so short, that it is scarcely remarked, and passes immediately into the second. Every symptom is then separately examined, and the change it undergoes in each stage, accurately described. We shall content ourselves with extracting an observation here and there.

The pain in the larynx and trachea, which some authors assert to be pathognomonic, is, according to Dr. Gölis's experience, not unfrequently absent, even in dangerous cases. When

present, it is generally increased by speaking and coughing, and always by pressure. It commences with the inflammatory, and ceases in the suffocative stage. All his patients that died of croup lost their voice some hours before death. A universal critical sweat never breaks out before the end of the inflammatory stage, nor when any other disease is present at the same time. Its appearance always indicates the passage into the stage of transudation, and the more copious it is, the less the quantity of lymph effused, an observation of great consequence, as regards the prognosis. When a sweat occurs between the third and fourth stage, it is cold and clammy, and announces the approach of death.

The duration, various terminations, and other circumstances of the disease being then considered, we next come to its diagnosis. This is a very elaborate part of the work, and occupies upwards of twenty pages; but the great improvement that has been made in the diagnosis of all the diseases of the respiratory organs, by the invention of the stethoscope, renders it comparatively of less importance. He is well aware of the existence of the disease called by Laennec acute suffocative catarrh, by others spasmodic croup, and by the Germans acute spasmodic asthma, or asthma Millari, from Dr. Millar, who published a work on it in 1755, which was soon afterwards translated into German. It seems that the disease is much more common in Germany than here, as there were several treatises subsequently written on it, and it is recognized as a not uncommon disease in childhood. Indeed there is too much reason to believe that the croup was frequently mistaken for it, and treated with musk and asafœtida, in consequence of which, many a child was hurried prematurely to the grave. Dr. G. himself relates three such cases, where the error was not discovered till the false membrane was found on examination after death. He states, that the relative frequency of the disease, is as one to ten; and after enumerating no less than nineteen points of difference between them, adds, that the only distinctions that can be depended on, are the difference of the pulse and urine, and the presence or absence of a perfect intermission. It is not unlikely that the disease described by Dr. Marsh, in the 5th vol. of the Dublin Hospital Reports, under the name of spasm of the glottis, was occasionally confounded with the asthma Millari. It is remarkable, that in treating of the complication of croup with other diseases, Dr. G. explicitly states, that though others mention its complication with cynanche maligna, he never saw a single instance of it. This assertion, from a man of his great experience, goes strongly to controvert the opinion subsequently mentioned by Bretonneau, of the frequent, if not constant, ex-

tension of the formation of false membrane to the pharynx and fauces. Among the occasional causes of croup, Dr. G. mentions contagion, and afterwards, in a distinct section of the work, proves the fact so strongly, that we cannot conceive how any one could feel a doubt remain after reading what he says on the subject. He relates several cases in which the disease was clearly derived from contagion, but allows that it is only when children are kept together in a small and not well ventilated room, that there is in general much danger to be apprehended. Still it cannot be denied, that it is the best way to act always as if croup were contagious under any circumstances. It can do no harm, and may prevent a great deal. He mentions a very interesting case of a woman, aged 26, who, in consequence of constantly kissing a child of her's while labouring under croup, of which he subsequntly died, was herself shortly after attacked with the same disease, and narrowly escaped with her life.

The next topic is the nature, situation, figure, and consistency, &c., of the false membrane. In considering the question, whether any exudation of the kind can be produced in the trachea by artificial means, he remarks, that he often found the protracted use of belladonna (which he exhibited in hooping cough with great advantage) cause a feeling of suffocation, and in one instance, a genuine inflammation of the trachea, with effusion of coagulable lymph. After some observations on the prognosis of croup, the author proceeds to the treatment, and on this part of the work we shall of course dwell more in detail.

He lays it down as a rule, in the commencement, that nothing cold is to be given to the patient, and that too free an afflux of cool air is especially to be avoided. With respect to venesection, he does not think it advisable, except in patients over three or four years old, and even then, only when symptoms run very high; leeching being quite sufficient for those below that age, under any circumstances. The time for employing either, is the inflammatory stage. For infants under a year, three or four leeches are sufficient; for those above that age, four, six, or at most eight. The quantity of blood to be taken by either method, varies from two to eight or ten ounces. Besides the difference of age, the physician is to be guided by the pulse, the colour of the face and lips, and the difficulty of respiration. Diluent drinks in the early stage, and the warm bath in every stage, are of great use. When other remedies fail, and the symptoms are urgent towards the end of the inflammatory stage, baths medicated with caustic potass, and decoction of poppy-heads or laudanum, are of wonderful efficacy. The shortest time sufficient for a bath is half an hour, and the longest

requisite two hours, according to circumstances. It is necessary that the water be not suffered to cool, and that the patient be dried with warm cloths, and then put into a warm bed. With respect to calomel, he conceives that it has the effect of retarding the exudation of coagulable lymph, and of diminishing its consistence and tenacity when exuded. He also mentions several cases where it appeared to act as a prophylactic. The dose, as a remedy, varies according to age, constitution, and the vehemence of the disease. To infants between two and eight months old, when the bowels are easily moved, or diarrhœa readily induced, he gives half a grain of calomel two or three times at an interval of as many hours: if they are habitually costive, the same dose may be repeated five or six times within the twenty-four hours. When the symptoms are very severe, he gives half a grain or a grain every two hours, till the patient begins to complain of pain in the abdomen, and to have copious dejections, mixed with greenish mucus. With infants between ten and eighteen months, this dose may be repeated six or eight times; but those between two and six or eight years, may take a grain five or six times within twenty-four hours. He strongly recommends blisters, in such cases as have required bleeding. They are best applied to the chest, and anterior part of the neck, and ought to be timed so as to begin to act almost immediately after the bleeding. When they have risen before the stage of transudation, they materially diminish the quantity of lymph poured out, if not till after its commencement, they prevent the continuation of the formation of false membrane, render the respiration easier, and promote expectoration. As to emetics, he does not approve of them, except in the catarrhal stage when mild, and in the stage of transudation. He greatly prefers ipecacuanha, to tartar emetic. Purgatives, with the exception of calomel, employed as above described, he considers unnecessary. Sudorifics he considers hurtful in any stage; but gentle diaphoretics given in emollient drinks at the beginning of the attack, are very useful. The inhalation of the vapour of warm water at the same period, is strongly recommended. Polygala senega he never observed to have the almost specific powers attributed to it. Antispasmodics are injurious, except in the nervous and spasmodic state, which sometimes remains after the disease has been got under. Tracheotomy can seldom or never be of any use.

After a few observations on the prophylaxis of croup, the work concludes with an account of seventeen cases; a copious list of the various writers on the disease; and an appendix containing thirty-one remarkable cases observed since the writing of the Essay, and illustrative of various positions laid down in it.

Beobachtungen über den Säuferwalmsinn oder das Delirium Tremens, von Dr. Georg Barkhausen. *Observations on the Mania of Drunkards, or Delirium Tremens.* By Dr. George Barkhausen. Bremen, 1828, pp. 243.

This treatise evidently proceeds from the pen of a man who has had a great deal of experience in this singular disease, and is at the same time perfectly acquainted with the opinions of all who have written upon the subject. Besides various periodicals, English, American, and German, he quotes Sutton, Armstrong, Albers of Bremen,* Lind of Copenhagen,† and Göden of Berlin;‡ and though he modestly disclaims the title of Monograph for his work, we have no hesitation in affirming it to be the completest that has yet appeared. For this reason, and also because it is written in a language, which (we are sorry to have to say) is not as familiar as it ought to be to the medical practitioners of these kingdoms, we shall present our readers with a pretty full analysis of it.

After a few preliminary observations on the confusion that long prevailed with respect to the nature of delirium tremens, or rather the ignorance of its existence as a distinct disease, it having been constantly mistaken for phrenitis, nervous fever, or mania; and some strictures on the immoderate and too exclusive use of opium introduced by the English, and carried to excess by their imitators in Germany and elsewhere, our author proceeds to define it as "a disease occurring only after the continued abuse of spirituous liquors; characterized by disturbances of the cerebral and nervous functions, namely, watchfulness, delirium, and peculiar hallucinations, frequently also tremors of the limbs, accompanied, or not, at its commencement by alteration of the functions of the vascular system, or by fever; remarkable for great tendency to collapse, and capable of being removed only by a critical sleep." He next enumerates in detail the predisposing and occasional causes, and observes, that the frequent abuse of *distilled* spirituous liquors, has a much greater tendency than that of wine to induce the disease. He also states, that he has frequently seen the immoderate use of strong beer, produce symptoms resembling a mild

* Abhandlung über das Delirium Tremens, aus dem Englischen übersetzt von Dr. Ph. Heineken; mit einem Vorrede herausgegeben von Dr. J. A. Albers. Bremen, 1820.

† De delirio tremente sic dicto observationum series cum epicrisi de morbi indole ac natura. Havnice, 1822.

‡ Von dem Delirium Tremens, Berlin, 1825.

or imperfect attack of delirium tremens. The occasional cause is mostly some fresh debauch, but it may also be any strong mental emotion, bodily disease, or physical injury; and he here remarks, that his experience confirms the observation of of Sutton, that such may be the case even after the patient has long given up the habit of drinking. He agrees too with Armstrong and others, that sudden and total abstinence from strong drink may prove an occasional cause, though this is denied by Dr. Lind.

The next topic is the division of the disease into its various kinds. Delirium tremens may be either acute or chronic, idiopathic or symptomatic, sthenic or asthenic. The last mentioned division he considers the most important, for a reason we shall presently learn.

Idiopathic delirium tremens seldom or never comes on without certain premonitory symptoms, though they often escape observation when not severe. These vary according to the individual, and are sometimes even different in the same person in different attacks; the principal are loss of appetite, gastrodynia, frequent eructations, diarrhœa, singultus, unusual peevishness and irritability, a feeling of oppression in the præcordia, which may amount to the utmost anxiety, great tendency to perspiration, ringing in the ears, a presentiment of sickness, a peculiar restless, flighty manner, obstinacy, and in short various deviations from the natural disposition. The attack is sometimes immediately preceded by a fit of epilepsy, or hæmorrhage from the nose, lungs, bladder, or hæmorrhoidal vessels.

Our author then proceeds to describe most minutely and graphically, the symptoms of the disease when fully formed. Those essential to it are watchfulness, delirium, and singular hallucinations, or deceptions of the senses, as already mentioned in the definition. Besides these disturbances in the mental and sentient, there are others of the vital and animal functions, more or less constantly present, though these also may depend on a morbid alteration of the nervous system in general. It is well known, that there is still a difference of opinion as to the presence or absence of fever in delirium tremens. Armstrong maintains, that it is a "strictly febrile" disease, and Lind and others agree with him; while as many are, with Göden, of the opposite opinion, and maintain that the nervous system alone is affected primarily. According to Dr. Barkhausen's experience, fever is very seldom absent during the whole course of the disease, sometimes appearing at the commencement, and ceasing before its termination, or else not shewing itself till towards the end. In unfavourable cases it is

never completely absent. The pulse of course undergoes corresponding alterations. Towards the end of unfavourable cases its frequency increases so much, that it cannot be counted, and it also becomes irregular. As to the trembling from which the disease takes its name, he agrees with Armstrong and Albers, that it is by no means a constant and essential symptom, as Sutton imagined. "In young, robust subjects, not as yet weakened by intemperance, it is sometimes absent, either wholly or at least at the beginning of the attack; or else is so slight as to be scarcely perceptible. Such cases, however, are comparatively few in number, because the constitution is speedily undermined by the abuse of spirituous liquors." The perspiration in general is very profuse, and the weaker the constitution of the patient, the more there is; it is then cool and clammy, and has a sour smell. The tongue, appetite, face, eyes, excretions, &c., are next passed in review, but we have not room for his remarks on these particulars.

We now come to an important part of Dr. Barkhausen's Treatise, the distinction between the sthenic and asthenic forms of delirium tremens. He remarks, that the neglect of this distinction is the cause of the very contradictory opinions that prevail on the nature and treatment of this disease. It generally assumes the sthenic form in robust subjects, particularly the young, or such of more advanced years as have not been long addicted to intemperance, so that the appetite, digestion, and constitution in general are not much impaired. The quality of the liquor too has a considerable influence; good spirits favouring the production of the sthenic, bad or adulterated of the asthenic form. Recovery from the sthenic form, though mostly brought about by art, is sometimes spontaneous; it frequently passes into the asthenic form, and occasionally terminates in death from sanguineous or serous effusion on the brain. The asthenic form occurs in elderly persons of broken constitution, especially when confirmed drunkards. In like manner, when the patient has been under the influence of any debilitating circumstances, such as depression of mind, poverty, or privations of various kinds, previously to the attack, it is apt to assume the asthenic form. These considerations, together with the full, bounding pulse, flushed face, hot head, and warm perspiration, in the one case, and the small trembling pulse, absence of signs of determination of blood to the head, and profuse cold sweat, with much more violent tremour in the other, will enable us to distinguish between the two forms. Dr. B. never saw an instance of spontaneous recovery from the asthenic form; and all that art can do is unavailing without it can procure sleep. When death occurs, it is in consequence of

exhaustion, and sinking of the cerebral and nervous powers. He never knew it to be produced by sanguineous apoplexy in this form.

On examination of the brain after death from asthenic delirium tremens, Dr. B. in general found the vessels, especially the veins, morbidly enlarged and moderately full, but not in a state of absolute plethora; the capillaries in particular were free from any appearance of the kind. In the sthenic, on the contrary, there were a general state of plethora and other signs of congestion in the head. On the whole, he thinks that delirium tremens may be placed between phrenitis and mania, and conceives it to consist of a primary affection of the whole nervous system, particularly the brain. That this affection is not inflammation, is proved by the fact, that there are often no signs of any found after death; whereas the occasional presence of such signs, proves how much the brain is involved in the disease.

We now come to the treatment of delirium tremens, and commence with that of the sthenic form. Dr. B. agrees with Armstrong and others, that venesection is not to be employed without the greatest caution, and only in young robust patients. Topical bleeding, though less dangerous, also requires great caution. Still, where we observe considerable determination of blood to the head, flushed cheeks, redness of the conjunctiva, and a strong pulse, a few leeches to the temples will be serviceable. He does not recommend purgatives, especially those of the saline class, except in the premonitory stage. When the disease is fully formed, he found them useless, or even hurtful. Sulphuric acid, in like manner, is of use only in the premonitory or imperfectly formed state, and during convalescence. The remedy on which he places the strongest dependence in the sthenic form is tartar emetic, which he asserts to be so efficacious as almost to deserve the name of a specific. Administered in such doses as to produce nausea, it has the threefold effect of a derivative, of a sedative, and thereby indirectly of an antiphlogistic; diminishing the preternatural activity of the nervous system, and opposing the determination of blood to the head, without the risk of producing any of the bad effects of bleeding or opium. He commences with five grains in as many ounces of distilled water, and gives a table spoonful every two hours. If this is tolerated, he gradually increases the dose, but does not think it ought to be pushed beyond ten or twelve grains in twenty-four hours. Under this treatment the patient becomes quieter, the pulse calmer and fuller, the tremors diminish, he yawns, grows sleepy, willingly lies down, and at last actually goes to sleep. If the sleep thus

procured does not continue long enough, the patient may get a few grains of Dover's powder towards night. If the solution should purge too severely, a little laudanum may be added to it. Cold applications to the head, where the patient likes them, are also useful.

The treatment of the asthenic form is very different. As tartar emetic is the sheet anchor in the one, so is opium in the other. However, if the tongue be very much loaded, and there be other signs of great foulness in the primæ viæ, it is advisable to premise an emetic or some other treatment to the same effect. As to the dose of opium, it varies in different cases, as a much greater quantity is requisite in some than in others, to produce the same effect. Albers, finding that large and frequent doses were apt to induce apoplexy, used to commence with half a grain every two hours, and gradually increase it, if requisite, to a grain. In extreme cases, he even gave two grains at the same interval, but never repeated it more than three times, and then diminished it again. Our author generally found half a grain every two hours sufficient; and if not, he gave a large single dose at night. He cautions us against leaving off the use of this medicine immediately after sleep has been procured, as the patient may then relapse. He gradually diminishes the dose, so as to keep him still in some degree under its influence for the next two or three days. If the opium does not stay on the stomach plain, it may when combined with an acid. Camphor sometimes succeeds when opium has failed, and liquor ammoniæ is occasionally very serviceable. He agrees with Armstrong, that the patient, especially if a confirmed drunkard, should not be totally deprived of his accustomed stimulant. He thinks that the calomel so strongly recommended by that author, acts only indirectly by removing obstructions in the liver and bowels, and thereby deriving from the brain.

We regret that we have not room to notice the observations on symptomatic and on chronic delirium tremens, as some of them are very interesting. The work concludes with a detailed account of twenty-five cases, successful and fatal, with the results of the *post mortem* examination in most of the latter.

We cannot conclude without stating, that though the treatment by tartar emetic, as recommended by Dr. B., is, we believe, quite unknown, or at least not practised here, still we have been informed that in some cases in which that medicine was given here in conjunction with opium, the result seemed more favourable than when the latter alone was employed. Dr. Barkhausen states positively, and we have every reason to give implicit credit to his statements, that he has seen

at least forty cases cured by tartar emetic administered in the mode already described. We think, therefore, that the evidence in its favour is sufficiently strong to warrant a trial.

The Cyclopædia of Practical Medicine. Edited by John Forbes, M. D., Alexander Tweedie, M. D., and John Conolly, M. D., London. Published in monthly parts.

Our readers are all aware, that within the last few years several dictionaries of medicine have issued from the continental press. The domain of medicine is so wide, that its cultivation is far beyond the efforts of any single labourer, and accordingly we find, that the works of individuals professing to be systems of medicine, are all lamentably deficient: they consist of mere compilations, or if the author, having cultivated some one part of the science to a degree at all approaching perfection, has given useful information in a particular department, he has elsewhere left but a sterile field. All systems of nosology being either defective or erroneous, are almost universally discarded both in teaching and writing; even if perfected, the benefit derived from them would be but trifling, while the vain attempts to establish them have only trammelled improvement. Men of science therefore, wisely abandoning them, are more usefully and beneficially employed in ascertaining the natures of those changes which constitute diseases, the symptoms and signs by which they are to be distinguished one from the other, and the appropriate treatment for their removal or palliation. To bring together, for the general information of the mass of the profession, the labours of such men, which might otherwise be lost or scattered among the passing periodicals of the day, there is no better mode than that now adopted, of publishing dictionaries of medicine; thus enabling each writer to bring to the subject to which he may have devoted his attention, all his information unshackled by system, and all his energies unimpeded by too great labour. The success that has crowned such publications on the continent, has induced our neighbours on the other side of the channel to publish a dictionary of medicine on a similar plan, to which, with less modesty than their continental cotemporaries, they have given the high sounding name of "*Cyclopædia.*" With some gratification we observe, that many of the contributors are from among our own practitioners. We may be excused here, if we digress for a moment to express our surprise, that while the productions of Irish writers have contributed, and are daily contributing to swell the pages and in-

crease the fame of English and Scotch periodicals, we have not, with the exception of the publication in which these observations are written, a single periodical in medicine or general literature, We have a sufficiency of material among us, and we must be ourselves to blame, if we do not henceforth supply a large portion at least of our home demand, and make an Irish periodical take that station to which it might be so justly entitled among its fellows of the day.

To return from our short digression, the "Cyclopædia of Practical Medicine" now in progress of publication, although perhaps high in price, when compared with the French dictionary also coming in parts from the press at the present time, is got up in a style of publishing creditable to its editors; and its contributors, at least the greater number of them, are men of eminence. We purpose taking a review in succession of all the important articles as they come out, and we trust our examination will be impartial, neither indulging in unworthy cavil on the one hand, nor bestowing indiscriminate praise on the other; but making our review what it ought to be, a fair criticism, giving praise when deserved, and correcting error when committed; and what is at least of equal consequence, making it a medium through which a mass of condensed information on the subject reviewed may be given to our readers.

We shall commence with affections of the brain, taking first on our list the article "Apoplexy." This is the production of a physician of eminence, Dr. Clutterbuck, and the subject must always be one of intense interest. In the whole catalogue of diseases, there is not one more calculated powerfully to engage feelings and attention, than that, which, like an unseen agent, suddenly strikes with death, the man who at the moment was perhaps in full health and spirits, dazzling with his eloquence or delighting with his wit; or if the blow be less severe, too often leaves him a paralyzed idiot, preserving only the living form of man, all the attributes of intellect for ever gone, and even in instinct lower than the mere reptile.

Apoplexy, in the article before us, is taken in its usual definition, as signifying sudden loss of intellect, with paralysis more or less extensive, respiration, and the action of the heart and general vascular system being continued; the causes producing these effects being various. Dr. Clutterbuck is, we think, right to take the term of apoplexy in this sense. It has been proposed by some late French writers, to exclude symptoms altogether from consideration in naming diseases, and to base our nomenclature in every instance on pathology, signifying always by the name of a disease, not a group of symptoms, according to nosologists, but some particular morbid lesion of

structure, the symptoms of which are then to be pointed out: and in accordance with this plan, to limit the term Cerebral Apoplexy to an effusion of blood in the brain, just as by the term Pulmonary Apoplexy is meant an effusion of blood into the texture of the lungs. Such a nomenclature would be very desirable, but in the present instance it would be practically inconvenient, because we are not able to connect any particular symptoms with an extravasation of blood in the brain, with the same certainty as we connect the symptoms and the morbid lesion in pulmonary apoplexy, the symptoms produced by effusion of blood from vessels of the brain being also produced by other morbid states. In such instances, until our diagnosis becomes more accurate, and in affections as hysteria, of which the pathology or causes of the symptoms may vary, it is better that we should continue to name diseases from a certain group of symptoms, pointing out the different causes or states that may give rise to these symptoms. The description of the varied ways in which apoplexy makes its attack, and of the varying symptoms it presents, is vivid and condensed.

" *General Description.*—There is great diversity in the mode of attack of apoplexy, as well as in the greater or less severity of its symptoms. Sometimes the attack is nearly instantaneous and complete; the patient, previously in apparent health, falling down insensible, with an immediate abolition of all the sensorial functions. On other occasions the approach of the stroke is felt by the patient; he puts his hand to his head, or makes an alarming exclamation of something unusual felt in the head; and then falls down insensible. In most cases, (and probably it would be found so in all, if sufficient attention were paid,) the attack is preceded, for a longer or shorter period, by pain in the head, or by more or less of disorder in the sensorial functions; such as tinnitus aurium, imperfect vision, numbness or a sense of pricking in the extremities, giddiness, imperfect articulation, loss of memory, drowsiness, or nightmare. The degree in which the sensorial functions are impaired in apoplexy is also various. In the more severe cases, sensation, voluntary motion and intellect, are all entirely abolished. In slighter affections, the patient retains some degree of consciousness, is sensible to impressions, and capable, to a certain extent, of voluntary movement. The pupils of the eyes are variously affected at different times. Although, in many cases, they are observed to be largely and equally dilated, and insensible to the impression of light, there are still more in which they are in a contracted state, though often unequally in respect of each other. Sometimes they contract and dilate alternately with great quickness, without being influenced by the stimulus of light. Sometimes one side of the body lies motionless, without manifesting the least degree of feeling, even when strongly irri-

tated; while convulsive movements, with perhaps some degree of feeling, are perceived on the opposite side. We are then enabled to predict that, in case of recovery from the apoplectic state, hemiplegia will be left behind. The disease consisting essentially, as will be shewn hereafter, in a suspension, more or less perfect, of the sensorial or proper functions of the encephalon, other functions are not necessarily deranged; nor when they are so, is it in any uniform way. Respiration, in violent cases of apoplexy, is commonly slow and laborious, the patient snoring loudly, as in deep sleep. At other times the breathing is natural. The general circulation of the blood, as indicated by the pulse at the wrist, is equally various in apoplexy. Sometimes, the pulse is slow, full, and bounding; with flushing and fulness of the face, and heat of the extremities: at other times the pulse is small and weak, or perhaps irregular; while the face is pale, the features are shrunk, and the extremities cold. In extreme cases, such as are likely to prove almost immediately fatal, the pulse from the beginning is imperceptible, or nearly so; the heart appearing to be paralysed, as well as the voluntary muscles. In such cases death quickly ensues. The alimentary canal is also variously affected in apoplexy. In some cases, the power of swallowing is lost or impaired; and in such it is hazardous to administer any thing by the mouth, as being likely to induce suffocation, or at least to excite violent cough, which is not without danger to the patient. In numerous instances apoplexy is ushered in by vomiting, the disease then is often referred to a disordered state of the stomach, as the primary cause; but generally without reason, the disorder of stomach being mostly secondary, and dependent upon the brain. The mistake is important, as leading to the employment of emetics, the use of which is not unattended with danger. The bowels are commonly torpid in apoplectic cases. Sometimes, however, the urine and fæces escape involuntarily. This marks a state of disease which generally proves fatal. Profuse sweating is also among the most unfavourable signs.

"Apoplexy may last but for a short time, as a few minutes, and then entirely disappear; or it may prove fatal immediately, or after the lapse of a few hours: it may even continue for several days, and then prove fatal. In a considerable number of instances it ends in hemiplegia, consciousness returning, while voluntary motion, and sometimes sensation are lost. Palsy has thus been called a minor degree of apoplexy. Hemiplegia may take place in very different degrees: the entire half of the body sometimes suffers, the medial line being marked with great accuracy; so that one half the tongue only, with its muscles, is paralyzed. Or the affection may be confined to the face, or to a single limb. The approach of apoplexy is sometimes denoted by merely a loss of feeling in one or more of the fingers."

Our readers need scarcely be informed, that an effusion of blood into one hemisphere of the brain, produces paralysis of

the opposite side of the body. This effect is explained by the decussation of the corpora pyramidalia which takes place at the lower part of the medulla oblongata, the right hemisphere of the brain supplying the left side of the trunk with nervous influence, and *vice versa*. We may, however, here observe, that it has never been explained, how it is that parts supplied by nerves coming off from the brain before the decussation has taken place, for instance, the side of the face and of the tongue supplied by the seventh and ninth nerves, should be engaged in the paralysis on the same side, as the other parts of the body supplied with nerves after the decussation.

The substance of the brain around an effusion of blood is frequently found softened, and of varying shades of colour, from very pale yellow, to a reddish or brownish hue, presenting the state described by Rostan, under the name of "Ramollissement." It is a question of importance in the pathology of the brain, and of the treatment of apoplexy, whether this state of the brain is the precursor, and the cause of the rupture of the vessel from which the effusion of blood takes place; or whether it is an affection subsequent on the effusion, partly owing to the infiltration of the colouring matter of the effused blood into the cellular tissue of the brain around, (just as we see the parts around a common contusion, presenting similar shades of colour from this cause,) and partly arising from inflammatory action in the brain around the blood, set up either as a preparatory process necessary towards forming a cyst, or excited by the presence of the effused blood, acting in some degree as a foreign body. This question is not glanced at in the article before us. We shall endeavour to supply the deficiency. Lallemand and Rochoux support the opinion, that ramollissement and colouring of the brain (" ramollissemens avec injection") exist in most instances prior to the effusion of blood, and that the ramollissement is in fact the cause of the effusion, being a diseased state of the cerebral tissue, involving the vessels, which then give way (on the slightest exciting cause, or even without any,) pouring out their blood into the softened brain, and thus producing the extravasation. The latter opinion is supported principally by Cruveilheir, and an attentive examination of cases of apoplexy, we think, supports Cruveilheir's opinion, viz. that ramollissement, and colouring of the brain are in most instances consecutive to the effusion of blood.

In cases of apoplexy terminating fatally, within a short period of time after the attack, this softened state of the brain is seldom met with. Of twelve cases of apoplexy related by Abercrombie, seven proved fatal within thirty-six hours, and there is no mention of ramollissement having been observed in any of these; while of the

remaining five which were not fatal for several days after the extravasation had taken place, (one of which arose from copious effusion on the surface of the brain, and should not perhaps be taken into the account,) ramollissement is noticed as having been found in three. Were ramollissement so general a precursor of the effusion as it is supposed by some to be, it should have been equally often observed in the rapidly fatal cases, as in those prolonged for several days. It is, however, not so. We know, and the above cases from Abercrombie support us, that it is usual, in cases of apoplexy rapidly fatal, to find effusion of blood without any appreciable lesion of the cerebral texture, save a mere mechanical tearing up of the fibres of the brain, produced by the effusion. The presence of ramollissement in cases protracted to ten, four, or even only three days from the occurrence of the extravasation, proves nothing on either side of the question, because in those cases it may be equally well supposed, either that the ramollissement preceded the extravasation, or that the extravasation preceded the ramollissement; while the absence of ramollissement from a great number of recent cases, positively proves, that it plays, if any, a very unimportant part in producing the extravasation of blood. Even if ramollissement exist previously to an apoplectic attack, we may doubt if it have much influence in producing the extravasation. Blood vessels are not easily implicated in morbid action going on around them, and we have seen cases of inflammation of the brain, in which a large proportion of the medullary tissue had become so diffluent, that it fell about semifluid on opening the cranium, and yet no extravasation of blood had occurred. An additional argument against the opinion may be drawn from those cases of apoplexy suddenly occurring in patients in good health up to the moment of attack, for it is hard to suppose that such a morbid change as ramollissement of the cerebral tissue should exist for any time, before the attack of apoplexy, as according to Lallemand's opinion, it must, without having given rise to a single symptom. The facts we have stated, and reasoning from them, make it more than probable, that ramollissement is in most cases consecutive to effusion, or at most has little or no influence in producing it. The diseased state of the arteries of the brain, one of the natural changes produced by age, appears to be a predisposing cause of apoplexy, of much greater power than a softened state of the brain.

In the explanation of the symptoms of apoplexy, in the article before us, we come to the following singular, and confident physiological announcement.

"The cerebellum being seldom affected in apoplexy, (the disease being for the most part confined to the cerebrum,) accounts sufficiently for the continuance of the action of the heart, and of respiration during the fit; these functions being more immediately dependent upon this part of the nervous system. For the same reason, other functions dependent upon the general circulation, often go on unimpaired, as secretions of various kinds, and the evolution of animal heat." p. 123.

This is so gross an error in the physiology of the nervous system, that it is inexcusable. Is it possible that a writer of the present day can be so utterly ignorant of the discoveries made regarding the nervous system, as not to know that whatever be the peculiar offices of the cerebellum, its office certainly is *not* to preside over circulation, respiration, or the evolution of heat. Is he ignorant of the very instructive and splendid discoveries of Sir Charles Bell on the nervous system? Is he not aware that there are numerous cases on record of acephalous fœtuses, in whom circulation and secretion must have gone on for months, and respiration has continued for some time after birth? Is he not aware, that revolting instances have occurred in which the operator has broken up, with the crotchet, both the brain and cerebellum of the fœtus, and yet, the little creature after coming into the world, has breathed and cried, and the operator has been obliged to finish his work by strangling? He must surely have at least heard of the brutal and disgusting experiments of physiological and phrenological amateurs, who have sliced the cerebella of living animals bit by bit, and yet respiration and circulation continued. It is true, that opinions are divided as to what *are* the functions of the cerebellum; that some physiologists assert, the cerebellum presides over voluntary motion, because when the skull is bored, and the cerebellum scooped out, the poor animal rolls about unable to move, as it did while its organs were whole—that others of the phrenological school more confidently assert, that it presides over the generative organs; while a third, but smaller party, who, however, from following the slow, but sure path of anatomy and pathology, are probably more likely to be right than either of the former, have put forward the supposition, that from the posterior column of the spinal marrow (which is admitted on all sides to give origins to the nerves of sensation) terminating principally in the cerebellum, one of its main functions is to preside over sensation; but, whatever the differences of opinion may be as to what *are* the functions of the cerebellum, there is at least no difference of opinion on this, that its functions *are not* what Dr. Clutterbuck states them to be.

On the exciting cause of apoplexy, we need not detain our

reader; there is nothing new to add. Next in order, we come to Observations on Treatment. Connected intimately with the treatment of apoplexy, and laid down as leading principles to guide it, there are in the Paper before us, some theories put forward, and assertions made, that we feel ourselves imperatively called upon to notice. We are told by the author, that "there is perhaps no disease, the treatment of which requires so much to be directed by theory, or general principles, as apoplexy." Whenever theory is permitted to guide us in treatment, it ought at least to be sound and unexceptionable, and this is more, we fear, than we can say of Dr. Clutterbuck's. We used to believe in the existence of determination of blood to the head—in the possibility of the vessels of the brain being more distended, or fuller at one time than another, and in the possibility of relieving these over-distended vessels, by blood-letting, when there was threatening of apoplexy; or if a fit had already occurred, of checking the further effusion of blood, by a copious and instant bleeding. We are now told, that all these notions were but idle ones: we shall, however, give, in his own words, the positions which our author puts forward, and which are laid down as principles to govern treatment, and afterwards examine the grounds on which these positions are erected.

"It follows, *ex necessitate rei*, that no material variation can take place within a short period, in regard to the absolute quantity of blood in the brain. *No additional quantity can be admitted into the blood vessels situated there*, the cavity of the skull being already completely filled by its contents. *A plethoric state, or over-fulness of the cerebral vessels altogether, though often talked of, can have no real existence;* nor on the other hand, can the quantity of blood within the vessels of the brain be diminished, any more than can wine or other fluid be drawn from a cask without furnishing an equivalent for the portion abstracted from it, by the supply of an equal bulk of air, which in the case of the brain, can of course find no entrance. *No abstraction of blood, therefore, whether it be from the arm, or other part of the general system, or from the jugular veins, (and still less from the temporal arteries,) can have any effect on the blood-vessels of the brain, so as to lessen the absolute quantity of blood contained within them.*" p. 125.

The notion, that the brain, under all circumstances, must contain precisely the same quantity of blood, whether in the patient suffering under inflammation of it, or in the wounded man dying of hæmorrhage, was first, that we are aware, broached by Monro, then supposed to be supported by the experiments of Kellie, afterwards sanctioned by Abercrombie, and finally adopted by Clutterbuck, as completely proved. As long as

this notion was no more than a fancy, we might bestow on it little consideration, but when it is put forward as a well established position, to be recognized as a guiding principle in treatment, it requires to be sifted: and here we must do Abercrombie the justice to observe, that although he sanctioned the notion, he did not, as we shall see, allow his good sense to be misled by it in practice. Even in giving it the sanction of his name, by introducing it into his work, he merely places it in a chapter headed "*Conjectures* in regard to the Circulation in the Brain."

The hypothesis we are examining, consists of two distinct parts; one, that no additional quantity of blood can be admitted within the skull, in consequence of the cavity of the skull being completely filled with its contents, and the brain being incompressible; the other, that the quantity of blood contained in the brain cannot be diminished by an abstraction of blood from any vessels, in consequence of the skull protecting the vessels of the brain from atmospheric pressure; the joint conclusion being, that the brain at all times in health and disease, must contain the same quantity of blood. From the first part of this hypothesis, the following deductions are *legitimately* drawn by Dr. Clutterbuck; if we are able to shew, that although *legitimately* drawn, they are erroneous, it then follows that the hypothesis itself must be false. The following are the deductions laid down:

First,

"When blood is suddenly or rapidly extravasated any where within the skull, the space thus occupied can only be furnished by the compression, and consequent emptying of the blood vessels in other parts of the brain." p. 125.

From which, the obvious practical inference is, that in order to prevent the occurrence of apoplectic extravasation in persons having a tendency to it, or to cut it short when it has commenced, the best mode would be, to place the patient with his head down, and his heels up, or to fasten a tight ligature round his neck, which preventing the exit of blood from the head, would effectually prevent the extravasation of blood within it.

Second,

"There may be a partial fulness or distension of vessels in one part of the brain only, but this must be at the expense of the rest of the brain, which will be proportionably deprived of the usual supply of blood." p. 125.

Are these deductions or assertions, whichever we may call them, born out by the pathology of the brain? If they be true,

then, whenever there is an extravasation of blood "any where within the skull," we should find some part of the brain deprived of its natural quantity of blood, and if the effusion be large, we should find the whole substance of the brain, and its vessels, completely exsanguineous, because, according to the position advanced, there can be room made for the extravasated blood, only by blood to an equal amount leaving the vessels. Is such the state in which we find a brain, where apoplectic effusion has taken place? Every one who has examined an apoplectic brain, will answer in the negative, and say, that instead of finding any part of the brain or its vessels exsanguineous, they are in almost every case observed to be loaded with blood. While writing these observations, we have had an opportunity of examining the head of a man who died very suddenly of an apoplectic attack. In the base of the brain was an effusion of half-clotted blood, to the amount of about three ounces. According to Dr. Clutterbuck's theory, a considerable portion of that brain, or of its vessels, should have been exsanguineous, in order to afford room for the effusion; instead, however, of being so, the vessels of the pia mater were gorged, and the substance of the brain itself so vascular, that a section of it presented an appearance of its being studded over with innumerable small ecchymoses. The second deduction given above, that "*there may be a partial fulness or distension of vessels in one part of the brain only, but this must be at the expense of the rest of the brain, which will be proportionably deprived of the usual supply of blood,*" is equally contradicted by pathology. If the statement quoted above were true, we could not have the vessels of the membranes, and of the substance of the brain distended at the same time. But what says our first authority in pathology on this subject: "In most cases of hyperæmia of the brain, the investing membranes, especially the pia mater, are also congested."—*Vid. Andral's Pathology, by Townsend and West,* vol. ii. p. 720. A curious consequence would result, were the brain incompressible, and deriving its incompressibility, as Dr. Clutterbuck supposes, from the large quantity of water entering into its composition. Pressure being made on any one part of the brain, from effusion or any other cause, the consequence should be, not, as Dr. Clutterbuck supposes, an impeded or interrupted circulation in *any particular part* of the brain produced by the local pressure, but an *equally* impeded or interrupted circulation over the whole organ, for, the brain deriving its incompressibility from the large quantity of water it contains, pressure on any part, would act as hydrostatic pressure over the whole organ; just as when we attempt to force a cork into a bottle full of water, the pressure is made not on

any particular part of the fluid contained, but every part of the inner surface of the bottle, and every particle of fluid in the bottle is equally pressed upon. Hence, in every case of effusion of blood or local pressure on the brain, were the positions put forward correct, there would be, not a suspension of the functions of one half of the organ, as in hemiplegia, but an equal suspension of the functions of the whole organ. It is stated, that "*the incompressibility of the cerebral substance is easily demonstrated by experiment*," p. 125; but as the experiment is not given, we must therefore be pardoned for being sceptical as to the assertion. The hypothesis of the incompressibility of the brain, is not supported by anatomy, for the brain and its membranes contain a large proportion of fine cellular tissue, one of the most elastic and compressible tissues of the body; and we find it completely contradicted by pathology, whether we examine the state of a brain, into which a recent apoplectic effusion has taken place, or one which has been in a state of acute inflammation. We trust we have proved satisfactorily, that the first half of the theory, which supposes that the brain is incompressible, and that no additional quantity of blood can be admitted into its vessels, is quite untenable. The other half of the theory, which asserts, that the quantity of blood contained cannot be diminished, and that "*no abstraction of blood therefore, whether it be from the arm or other part of the general system, or from the jugular vein (and still less from the temporal artery) can have any effect on the blood-vessels of the brain, so as to lessen the quantity of blood contained within them*," necessarily falls to the ground with the first part; for if it be established, that more than the natural or healthy quantity of blood can be admitted within the skull, it follows that the superabundant quantity may be withdrawn, the parts within returning to their former healthy state; so that it should at least be granted, that in cases of disease, where there is more than the natural quantity in the brain, the overplus may be withdrawn.

We might leave this matter here, but lest the experiments of Dr. Kellie, to which Dr. Clutterbuck alludes, should be supposed to support this theory, we shall notice Dr. Kellie's Paper. Dr. Kellie, in the first volume of the "Transactions of the Medico-Chirurgical Society of Edinburgh," gives a number of experiments on sheep and dogs killed in various ways, for the purpose of ascertaining the state of the vessels of the brain after various modes of death. It is unnecessary for us to go through the details of the experiments made by Dr. Kellie on animals killed in various ways, by bleeding, by tying the jugular veins, poisoning by prussic acid, &c. There are proofs enough in the Paper relating these expe-

riments, to shew us that the vessels of the brain *can be unloaded by* bleeding. Dr. Kellie says, p. 108, "he examined the heads of two sheep which had been slaughtered for the market by the butcher in the usual way. These brains were decidedly paler, and we all agreed, that they contained less red blood than the brains of the two sheep whom we had bled. They had a more watery and serous aspect as it were, but there *was no palpable effusion of serum on their surfaces or within the ventricles.*" Here we must observe, that Dr. Clutterbuck, in giving an abstract of these experiments, has been guilty of inaccuracy. He says, "in a few instances the brain appeared to contain less blood than usual, but then there was found some serous exudation;" but Dr. Kellie, in the passage above quoted in his own words, after saying there was less blood than usual, goes on to say there was no palpable effusion of serum.

As a summary of the experiments on the sheep, we may state, that of six sheep killed by bleeding from arteries or veins, and under various occompanying circumstances, the brains of five were found deprived of a greater or lesser quantity of their blood, so that any result to be drawn from these experiments so far, is against the theory supposed to be supported by them. The seventh sheep is not taken into account, because the jugular veins were tied, and the blood of course not allowed to escape. Next follow six experiments on dogs, some of them unsatisfactory from the vague wording of the descriptions. In experiment first, "G, page 111," a dog was bled to death from the femoral arteries. The sinuses were loaded, dura mater pale, vessels of the pia mater *delicately* filled. "Experiment H," a dog bled to death from the carotids. "The brain seemed upon the whole more depleted than usual," p. 112. "Experiment I," dog bled to death from the jugular. Dura mater pale, and sinuses moderately filled; numerous vessels on the surface of the brain moderately injected. "Experiment K," this experiment we shall not take into account, as the dog was not killed by bleeding, but by enclosing the carotids and eighth nerves in ligatures. The vessels of the brain were found partially emptied. "Experiment L," p. 113, both carotids and both jugulars tied. The animal lived twelve hours. "*Not only the pia mater through its whole extent, but the cineritious substance of the brain itself*, had a suffused, reddened, and as it were bloodshot appearance. In short, the brain was gorged with blood in *all* its minuter vessels, and there was a little serum in the ventricles." This experimnt proves pretty satisfactorily, that Dr. Clutterbuck's assertion, that "a plethoric state or over-fulness of the cerebral vessels altogether, though often talked of, can have no real existence," is, to say the least

of it, very erroneous. Sixth "experiment M," p. 114, dog poisoned with prussic acid. We shall give the observations on this, and the general impression made by the experiments, in Dr. Kellie's own words: "the brain was every where turgid with blood, the veins and sinuses were loaded and congested, *and it was quite evident* that this and the brain of the dog L, contained, *beyond all doubt or dispute,* a much larger quantity of red blood, than the brains of any of the animals which had been bled to death." He speaks still more positively in p. 115: "These comparative experiments afforded us the most satisfactory proof, that the other brains had been *really depleted by bleeding, and their vessels drained of a very sensible portion of the red blood* usually contained in them."

Two dogs were trephined, then bled to death, and suspended by the ears for three hours after death. The brains were more bloodless than in any of the former experiments. This was to be expected, but the result of this experiment merely tells us, what no one could think of denying, that if the protection of the skull be taken from the blood-vessels, they will be emptied more completely than when the skull is left entire, but they obviously do not in any degree contradict the conclusions from the former experiments, that the brains "had been really depleted by bleeding," the skulls remaining whole. We may observe too, that the trepanning was assisted by suspending the dog by the ears for three hours after death, which does not appear to have been done in any of the previous experiments. In the last experiment, p. 139, two dogs were killed by prussic acid, one suspended by the ears, and the other by the heels, and even with all the writer's predisposition to make it appear, that posture or gravitation has no influence in altering the quantity of blood within the head, the following is the description: "in the dog suspended by the ears, the dura mater had few conspicuous vessels; those of the pia mater were tolerably large and numerous, but not turgid. The sinuses did not contain much blood, the serous effusion at the basis of the brain amounted to nearly a drachm." In the dog suspended by the heels, "the dura mater exhibited no increase of vascularity. The veins of the pia mater were rather more filled, and the sinuses decidedly more turgid than in the other dog, but there was no palpable quantity of serum in any part."

We have now given the experiments of Kellie, which are the main supports of the singular hypothesis, that the brain must at all times contain the same quantity of blood, and we think it is plain, that so far from supporting that hypothesis, these experiments directly contradict it. We are very far from asserting, that the vessels of the brain can be completely emptied

by bleeding, in the same manner as the vessels of other parts. The skull will always be an obstacle to this, but not such an obstacle as to prevent an unloading of the vessels of the brain to an appreciable degree.

We may, perhaps, be considered to have spent too much space in exposing the fallacy of the hypothesis advanced by Dr. Clutterbuck; we should not have given it so much consideration, but for the place in which that hypothesis has appeared, in a work, which may perhaps be a class book for the pupil, and a book of reference for the practitioner.

The hypothesis which we have reprobated has so much hold over Dr. Clutterbuck, he seems to be impressed so firmly with the belief that bleeding has no power in unloading the vessels of the brain, that he allows it constantly to mingle with and interfere with his advice on treatment. He says, p. 130, "it is above all things necessary to guard against the profuse and unqualified use that is made of the lancet." And after admitting, that no absolute line of distinction can be drawn between serous and sanguineous apoplexy, he says, speaking of the former, "in no case, even during the fit, could a large abstraction of blood be proper. Such a remedy, supposing the fit to be the immediate result of arterial excitement merely, without a rupture of vessels, is unnecessary, as the increased vascular action will probably subside by milder means, or even spontaneously; while, should effusion have taken place, the largest blood-letting could effect nothing direct towards its removal, and might even prove immediately fatal."—p. 132. And p. 133, speaking of simple apoplexy, he recommends "blood-letting to a moderate extent." We are quite sure that the advice is given on the wrong side, and that in the very great majority of cases, if an error be committed in the treatment of apoplexy, it is not on the side of using the lancet and other active means too freely, but too sparingly. What says Dr. Abercrombie? p. 288, "we have no certain mark by which we can ascertain the presence of effusion; and finally, we have found that even extensive extrasavation of blood in the brain, may be entirely recovered from, by the absorption of the coagulum. These considerations give the strongest encouragement to treat the disease in the *most active and persevering manner*. They teach us also, not to be influenced in our practice by the hypothetical distinction of apoplexy into sanguineous and serous; and finally, not to be hasty in concluding in any particular case, that the disease has passed into a state in which it is no longer the object of active treatment.

"In the treatment of apoplexy, our remedies are few and simple; those on which our chief reliance is to be placed, *are*

large and repeated blood-letting, active purgatives, and cold applications, &c."

Doctor Clutterbuck recommends "the *moderate* application of cold to the head;" we suppose in imitation of the good-natured physician, who, through kindness to his patient, ordered the ice to be warmed. Hear Dr. Abercrombie's direction on this point: "the effectual application of cold to the head is the third remedy on which we rely, and it is equally applicable to the different states of the disease, whether arising from simple apoplexy or extravasation. It may be applied either by means of iced water, or pounded ice in bladders; or by a full stream of cold water directed against the crown of the head, and received in a basin held under the chin, while the patient is supported in a sitting posture. I have formerly given an example of a patient restored in a few minutes or rather seconds by this remedy, from a state of perfect apoplexy," p. 289. It is singular and instructive, to compare the effects of theory upon different minds. Dr. Abercrombie and Dr. Clutterbuck both support the same hypothesis in regard to the circulation in the brain, but, while Dr. Clutterbuck has allowed it to become a deceptive guide in practice, making him believe that blood-letting is of comparatively little power, and that in apoplectic attacks, "only a moderate though perhaps repeated abstraction of blood can be required," Dr. Abercrombie impresses upon us, that even for days the most active treatment should be persevered in, and in support of this advice relates the following: "In one of the last cases that occurred to me, the bleeding was repeated to the extent of upwards of 100 ounces, assisted by purging from the croton oil, repeated to the extent of above twenty drops, and the case terminated favourably, after the symptoms had continued in a very doubtful state for three or four days."

Under the division of the treatment of apoplexy, arising from tumours in the brain, there are inconsistencies, which we have in vain attempted to reconcile. "Small and repeated blood-lettings afford the best if not the sole chance of success in such cases," and then a little farther on, "it is *to quantity and the rapidity of taking away* blood that we are to look, &c." The meaning of the following sentence we are utterly unable to unriddle. "The safety of blood-letting in both modes (local and general) depends upon quantity, but not so the efficacy of the practice." p. 133.

The whole of the directions on treatment are very insufficient for young practitioners, and there is not a word of caution about the peculiar and imminent danger which hangs over a patient at the distance of some days after an apoplectic attack,

when an inflammatory affection is so likely to set in suddenly, and carry off the patient; just at the time when, to an ordinary observer, the danger seems to have passed away. We now take leave of this article; we have been unwillingly obliged to censure it, but the subject, whether viewed in regard to the profession, or the public who intrust their lives to that profession, is of too much moment to allow any consideration, but that of stern justice to guide us, and we have doubly felt it our duty to point out its errors, on account of their appearance in a work that may, from many of its articles, and deservedly too, be looked up to as a standard authority. We had intended in the present number to add a review of the article next in the work, "Pulmonary Apoplexy;" but in order to make the present review what we promised at its commencement, we have occupied so much space, that we shall defer the other to our next number.

Symbolæ ad Ovi Avium Historiam, ante Incubationem, Auctore Joanne Evangelista Purkinje, Professore Medicinæ, P. O. Vratislaviensi: adjectæ sunt Tabulæ duæ Lithographicæ: Lipsiæ, sumptibus Leopoldi Vossii, 1830, 4to. pp. 24. *Contributions to the History of the Egg of Birds before Incubation.* By John Evangelist Purkinje, Professor of Medicine at Wratislav.

The work whose title is prefixed, is one of the almost daily proofs issuing from the foreign press, of the superior industry of the continental physiologists in their cultivation of the field of science, purely for its own sake; and in no department more remarkably than in their investigations on the subject of generation.

For although it cannot be forgotten, that for almost the whole ground-work of their knowledge they are indebted to our immortal Harvey, still it must be confessed, that we have had none here to raise the superstructure on the foundation laid by him; for what are the few experiments of Haighton and Cruickshank, or the ill-contrived attempts of Blundell, when compared with the host of facts afforded us by the writers of France and Germany; the works of Haller alone on this subject, afford a greater quantity of valuable information, than has been supplied by all the authors of this country since the days Harvey.

"'Tis true, 'tis pity, and pity 'tis 'tis true."

And how true, we may perhaps infer from the fact, that we have not in the English language, as an original production,

a single accurate or complete account of the human ovum in the earlier periods of its existence. We cannot even except from this censure, the magnificent and imperishable description of the gravid uterus by Wm. Hunter, the discoverer of the Decidua Reflexa, in which, that branch of the subject, even with the assistance of Baillie, is brief and imperfect, and fades almost into insignificance when compared with the admirable descriptions of the " œuf humain," by Desormeaux or Velpeau.

The monograph of Purkinje forms in every respect the counterpart of that of Bäer, " de ovi mammalium et hominis genesi," and does for the egg of birds what Bäer has accomplished for that of the mammalia, illustrating his descriptions by two lithographic plates, most beautifully and delicately excuted in white, upon a black ground, containing thirty drawings, illustrative of the structure of every part of the unincubated egg, and of the apparatus by which it is formed and expelled.

In the second section, the author gives a very interesting account of the cicatricula, as it appears under different conditions in the ovule of the ovary, in the oviduct, and in the egg after expulsion, which he follows up by a description of the evolution of the germinative vesicle (*vesicula germinativa*), p. 4.

Section fifth treats of the evolution of the yolk and its composition, concerning which we have the following piece of information, " to gratify those who delight in miscroscopic observations, I add, that the boiled yolk, which readily separates into powder, presents heaps of very elegant corpuscles resembling crystals in their form, and presenting different appearances according to the part of the yoke from which they are taken." p. 8.

The eighth section, on the " motions of the oviduct and infundibulum and their muscular organ," is highly interesting and satisfactory; and the same may be said of the ninth, " on the reception of the ovule from the ovary, by the infundibulum of the oviduct," of which the author offers the following explanation, supposing that when the ovule is about to leave the ovary, the aperture of the infundibulum is dilated, and receives the whole ovule, while, at the same time, its membranous expansion is contracted by the fibrils which run along its margin, and thus closely constringes the stalk or attachment of the ovule, by which, the supply of blood to the calix being cut off, it becomes attenuated, and bursting, lets the yolk escape, to be transmitted by the infundibulum through the oviduct. p. 13.

The author denies the existence of a third albumen, and maintains, that the part so called by some, and which more immediately invests the contorted thread of the chalazæ, is merely

a more condensed portion of the second albumen. He also denies that the albumen has a peculiar membrane, and appears to prove satisfactorily, that the natural structure of the albumen being in successive laminæ, these can by care after immersion in water or spirit, be successively removed, and so give the idea of a succession of membranous layers.—See *Sections* 12 and 16, and *Fig*. 22.

In the description of the chalazæ and their use, we have this very interesting observation.

"The insertion of the chalazæ at the side of the axis of the yoke effects this useful purpose, that by the influence which they exert on the centre of gravity of the yoke, the cicatricula (and consequently the germinative vesicle) always occupies the upper surface of the yoke, and is thus more closely exposed to the heat of the hen during incubation."—*Section* 18, *Fig*. 24.

Of the truth of the above statement, we have satisfied ourselves by the examination of several eggs, from which, having removed a section of the shell of sufficient size to afford a view of the yoke, we invariably found the cicatricula on its upper surface.

Our author concludes, by an account of the formation of the shell, and a description of the functions discharged by the different portions of the oviduct, with which we shall conclude our notice of his work, the perusal of which has afforded us much gratification.

"Whilst the shell is forming, we find its membrane at first sprinkled over with very minute calcareous scales, almost equal in size, and in the form of polygons, these afterwards are accumulated and grow together, leaving almost imperceptible spaces to allow of transpiration."

"If we examine the oviduct from its infundibulum to its termination in the cloaca, we shall find its different portions destined to the following functions. The orifice of the infundibulum receives the vitellus from its calix, the succeeding tract of the oviduct, amounting to about one-fourth of its whole length, and provided more sparingly with glandular apparatus, secretes the membrane of Dutrochet, and the inner structure of the chalazæ; further on, the internal membrane of the canal is covered with a muciparous parenchyme of some density, for two-fourths or more of its whole length, and supplies an abundant covering of albumen to the vitellus. Next, the isthmus contracts the oviduct, and in the succeeding tract as far as the uterus, the membranes of the shell are formed around the albumen,—lastly, in the uterus is accomplished the secretion of the shell, and the vagina expels the egg through its external orifice, and through the cloaca."

SCIENTIFIC INTELLIGENCE.

CHEMICAL SCIENCE.

Thenard on Bi-sulphide of Hydrogen.—M. Thenard has lately published a very remarkable work on the hydruret of sulphur; this substance, obtained by Scheele, and examined by Berthollet and Berzelius, acquires great importance from the observations of M. Thenard, who remarks, that a perfect analogy exists between its properties and those of oxigenated water.

The composition of hydruret of sulphur is very variable: M. Thenard found in it one atom of sulphuretted hydrogen, or its elements, and 6 or 8 atoms of sulphur. To prepare it, M. Thenard employs muriatic acid diluted with twice its weight of water, and the hydruretted sulphuret of lime obtained by boiling lime, with a great excess of sulphur, in water. The acid being poured into a funnel, the aperture of which is corked, the sulphuret is afterwards very slowly added, taking care to stir the mixture continually. The hydruret of sulphur, which separates first, is more fluid than that which is afterwards obtained. Nothing is easier than to procure it in separate portions.

The hydruret of sulphur is liquid, but its consistence is very variable; it is yellow, sometimes with a tint of greenish brown. It whitens the tongue in the same manner as oxigenated water, and occasions a smarting sensation. It whitens and alters the skin rapidly. The colour of turnsole is immediately destroyed by it.

Its smell is peculiar and disagreeable; at 140° to 160° of Fahr. it begins to decompose into sulphur and sulphuretted hydrogen. When suffered to remain, it gives out from time to time bubbles of sulphuretted hydrogen, and sulphur only remains. Charcoal and several metals in powder disengage sulphuretted hydrogen. The same occurs with a great number of oxides, as the peroxide of manganese, silica, the alkaline oxides; and what is very remarkable, potash and soda in solution produce the same effect.

The easily reducible oxides, as those of gold, silver, &c., occasion instantaneous ignition; the oxide is reduced, and water is formed.

All the sulphurets tend to disengage sulphuretted hydrogen. This effect is especially remarkable with the alkaline persulphurets in solution; but then sulphur is deposited. Some organic matters decompose hydruret of sulphur but slowly. The action is rather stronger with animal substances; water and alcohol do not dissolve it; but it decomposes in them, though but slowly. Sulphuric æther dissolves it, and soon leaves crystals, which appear to be sulphur.

Acids impart stability to the hydruret of sulphur; a little acidulated water is sufficient to produce this effect. In this case it not only does not decompose spontaneously, but the peroxide of manganese ceases to act upon it.—*Journal de Pharmacie*, Feb. 1832.

Chemical Pathology of Cholera.—Dr. O'Shaughnessy has published a most elaborate examination of the composition of the blood, and of the fœcal matters in this terrific malady; and deduced from his results, pathologic and therapeutic inferences equally interesting and useful.

In his experiments, (which accord perfectly with those made by Foy at Warsaw, and by Rose and Wittstock at Berlin,) he found the principal alterations of the blood to consist in a great diminution in quantity of the water, so that the quantities of the organic principles are relatively much augmented; the serum being small in quantity, imperfectly separated, and of a much higher specific gravity than in health, usually about 1,040. Occasionally, there is no separation into coagulum and serum, the whole mass of the blood remaining thick like tar. These cases are the most rapidly fatal. The quantity of the saline matters is also much diminished, particularly the carbonate of soda, which usually disappears altogether, and hence the serum is much less alkaline in its reaction, than in the natural condition.

We subjoin a table, showing the relative composition of three specimens of blood: one in health, the second in cholera, and the third in bilious diarrhœa. It is remarkable, the totally opposite change which takes place from the normal standard in the two last-named diseases, and as Dr. O'S remarks, it may form a mode of distinguishing between them in case the cholera should domesticate itself in this country.

COMPARATIVE ANALYSIS OF SERUM IN HEALTH, MALIGNANT CHOLERA AND BILIOUS DIARRHŒA.

Ingredients.	Healthy Standard of Lecanu.	Malignant Cholera. Mrs. Barras.	Bilious Diarrhœa. Mr. Hawthorn's.	Remarks.
Water	906.00	854.00	921.75	
Albumen	78.00	133.00	61.85	
Urea	0.00	1.40	0.00	
Organic matter: Soluble in alcohol and water	1.69	4.80	*5.20	* The 5.20, third column, includes organic matter, and albumenate of soda.
Albumen combined with soda . .	2.10			
Fatty matter: *a.* crystalline . . .	1.20	†1.40	†1.90	† The 2d and 3rd column include both *oily* and *crystalline*, principles.
b. oily	1.00			
Muriate of soda . . Muriate of potassa	6.00	4.00	‡5.00	‡ The 5.00, 3rd col. embrace the muriate of soda and potassa, the carbonate, phosphate, & sulphate of soda.
Carbonate of soda	. . . . .	0.00	§2.30	
Phosphate of soda Sulphate of soda	2.00			
Carbonate of lime Carb. of magnesia Phosphate of lime Phos. of magnesia Phosphate of iron	0.91	1.60	‖1.10	§ The 2.30, 3rd col. include the carbonate, phosphate, and sulphate of soda.
Loss	1.00	0.80	0.90	‖ The 1.10, 3rd column, embraces all the earthy salts.
Total	1000.00	1000.00	1000.00	

Sp. gr. of the serum 1.28. *Reddened turmeric paper.*

Dr. O'S does not consider the morbid state of the blood as the primary lesion in cholera; he very properly regards it merely as an effect of a deleterious agent, acting through the nervous system, but considers that this thickened state of the blood may occasionally produce death, by a kind of suffocation. His practical inferences are, to

restore the blood to its natural state of attenuation by diluent drinks; or by enematas, and, if necessary, he would consider the injection of water into the veins a feasible experiment. He proposes that in these instances, the water should hold in solution a proper proportion of those saline matters which naturally exist in the blood, as these principles also are diminished in the diseased fluid.

In an appendix, he gives, among other matters, an account of the composition of the alvine dejections, and minute directions for the mode of analysing these animal fluids.

The dejections are partly solid and partly liquid, they contain no trace of bile. The solid portions consist of fibrine and albumen; the liquid contains albumen, mucus, and those salts in considerable quantity which we before mentioned, as being reduced in quantity in the blood.

Analysis of Balsam of Mecca.—From the scarcity of the plant (oppobalsamum) yielding this balsam, and its frequent adulteration, its chemical properties and composition had not hitherto been ascertained; it was considered to be nearly identical with balsam of Canada, which was, in commerce, very often sold for it. M. Bonastie having obtained some specimens of the balsam from unexceptionable sources, viz.: one which had been sent by the Ambassador of the Porte to Napoleon for Maria Louisa, and second, which had been found in an old Egyptian tomb, has completed an analysis of it.

It consists of—

Soluble Viscid Resin -	70
Insoluble Viscid Resin -	12
Very fluid Essential Oil -	10
Bitter matter soluble in Water	4
Acid Matter - -	3
Ligneous Impurities -	1
	100

The resin of the Balsam of Mecca is easily distinguished from that of Balsam of Canada by remaining viscid when dried, it does not become brittle or pulverizable like common resin. By this character the genuine nature of the substance presented for sale may be ascertained.—*Journal de Pharmacie, Feb.* 1832.

Analysis of the Leaves and Fruit of the Solanum Lycopersicum.—By Professor Foderé and M. Hecht. In examining the leaves of the Solanum Lycopersicum (pomme d'amour) M. Foderé was struck by the strongly acid and nauseous odour which they exhaled, and which adhered to the hands. Wishing to examine them more at length, he, in conjunction with M. Hecht, an apothecary, collected a quantity, and expressed the juice. The vapours which the juice exhaled during evaporation were so strong, that the person employed in the process, was affected with vertigo and vomiting, and a state resembling intoxication.

The small quantity of the juice operated on, did not allow of the proportions of the principles being determined. It contained an alcaline principle soluble in water, sulphate of lime, animalized extractive matter, and a colouring matter united to a peculiar essential oil, soluble in alcohol and ether.

From about three pounds of the fruit, nearly 24 ounces of juice were obtained for analysis: owing to the smallness of the quantity, the alcaline principle to which it owes its narcotic properties could not be isolated. They obtained,

1. An acid not acetic, destructible by distillation, and united to a bitter principle resembling solanine.

2. A volatile oil, very easily vaporized.

3. An extracto-resinous matter, of a strong disagreeable smell, resembling dulcamara.

4. Vegetable albumen.

5. A sweetish matter mixed with mucus, and

6. Sulphate and muriate of potash and lime, with some uncombined potash.—*Journal de Pharmacie, Feb.* 1832.

M. Fischer on the Combinations of Deutoxide of Azote with the salifiable Bases.—All the alcalies and alcaline earths, form with deutoxide of azote, salts, neutral, crystalline, and soluble in water and in alcohol. When carefully heated, they fuse, and form a liquid which cools into a crystalline mass. The aqueous solutions of these salts are slightly yellow, they re-act on most of the metallic salts, and in this point of view resemble the cyanurets of iron and potassium, sulphide of hydrogen, &c.

When the combination of deutoxide of azote with an alcali, reacts upon a metallic solution, the product is always a combination of deutoxide of azote with the metallic oxide; a compound which is precipitated when it is insoluble, but occasionally remains in solution, as in the case with silver.

The alcaline and earthy salts of deutoxide of azote are prepared, when the corresponding nitrates are calcined at a proper temperature. The preparation of these alcaline salts is very difficult, according to M. Fischer. The calcined salt is *never* a proper compound of nitric oxide and the base. It always contains nitrate unaltered and also free base, the quantities vary according to the temperature employed. Nitre calcined at a full red heat, leaves a residue composed of seven parts of undecomposed nitric acid, and one of the combination of deutoxide of azote with potash. M. F. considers that the best mode of proceeding is to decompose the compound of deutoxide of azote and oxide of silver (which is easily prepared from the nitrate) by means of the alcalies or their chlorides.—*Annalen der Physique und Chimie,* 1831, p. 160.

Charcoal for cutting Glass.—The following is the mode of cutting glass apparatus used by Berzelius:

℞ Gum Tragacanth		2 ounces.
Water	-	5 ounces.
Gum Arabic	-	2 ounces.
Benzoin	-	1 ounce.
Storax	-	$\frac{1}{2}$ ounce.
Nitre	-	50 grains.
Charcoal	-	8 ounces.

Reduce all to powder except the benzoin and storax, which are to be dissolved in a sufficient quantity of alcohol. The whole are beaten in an iron mortar into an homogeneous mass. The mass is then to be formed into small cylinders of the size of a goose quill.

When it is required to use them, a line is to be cut with a file on the glass vessel where it is to be divided, and the end of one of the cylinders of charcoal having been ignited, is to be applied and carried round the vessel in the direction of the line, which almost always separates accurately. In this way, very useful vessels may be made out of broken apparatus.—*Journal des Connaisances Usuelles*, 1831.

Decomposition of Alcohol by Chlorine.—M. Liebig has been occupied with researches into the nature of the action of chlorine upon alcohol, æther, and pyro-acetic spirit. The following are the results of his experiments:

1st. When chlorine is passed into absolute alcohol, the latter is changed entirely into a white crystalline mass:

2ndly. This crystalline matter is a hydrate of a new combination formed of chlorine, carbon and oxygen, and which M. Liebig has provisionally termed *chloral.*

3rdly. Chloral deprived of water is a liquid heavier than water, and unites with it. In combination with water it changes after some time into a white powder, which is insoluble in water:

4thly. The anhydrous alkalies do not decompose chloral, but with the addition of water it is converted into formic acid, and a new chloride of carbon:

5thly. This new chloride of carbon is produced also in great quantity by distilling alcohol with chlorite (chloride) of lime.

6thly. By the action of chlorine upon æther and pyro-acetic spirit, compounds analogous to chloral are produced.—*Ann. de Ch. et de Phys.* xlvii. p. 233.

Dumas on Chlorine Ether.—M. Morin of Geneva, having lately published a memoir on this substance, and given the following as the result of his analysis, M. Dumas has again undertaken to examine it. According to M. Morin it consists of

Carbon	38.4,	which are nearly equivalent to	4 atoms.
Hydrogen	2.8	- - -	3 atoms.
Chlorine	56.8	- - -	1 atom.
	100.0		

M. Dumas remarks that these results differ most materially from those obtained by other chemists. It had been shown by Messrs. Robiquet and Colin that it consisted entirely of carbon, hydrogen and chlorine: and a short time after, M. Gay Lussac determined the density of its vapour, which he found to be exactly equal to the sum of the densities of chlorine and bi-carburetted hydrogen; and he ascertained it to be a compound of equal volumes of these gases. These conclusions were confirmed by the direct analysis of M. Despretz; and M. Dumas finds this to be its true composition, and that it consists of

Carbon	24.6, which are nearly equal to	2 atoms.
Hydrogen	4.1, - -	2 atoms.
Chlorine	71.3, - -	1 atom.
	100.0	

Ann. de Ch. et de Phys. xlviii. 185.

Chloride of Sulphur.—M. H. Rose prepares pure chloride of sulphur by passing dry chlorine gas over flowers of sulphur till they are nearly all dissolved, then distilling by a very gentle heat. Prepared in this way it contains no excess either of chlorine or sulphur. He analyzed it by decomposing the chloride with fuming nitric acid in a close bottle, and precipitating the sulphuric acid by chloride of barium.

The mean of the two analyses gave

			Theory.		Experiment.
Sulphur 2 atoms	= 4.022	=	52.39	=	52.54
Chlorine 1 atom	= 4.426	=	47.61	=	47.46
	8.448		100		100 *

agreeing with the previous results of Thomson and Bucholz.

In systems of chemistry another chloride is generally described on the authority of Davy and Dumas, containing twice as mnch chlorine, and it is said to be formed by passing chlorine gas through the above chloride as long as any is absorbed. M. Rose tried in vain to obtain by this process any definite compound; nor was he more successful in obtaining an atomic compound containing more sulphur by digesting the chloride on flowers of sulphur at different temperatures, and analyzing the solutions obtained. He therefore concludes that we are at present acquainted with no definite compound of these two elements but the di-chloride above described, and which was discovered by Dr. Thomson in 1803.

Hydro-carburetted Chloride of Platinum.—The chloride of platinum does not dissolve in alcohol. When heated, however, it is

* *Pogg. Ann.* xxi. p. 433. Rose considers this chloride as a compound of atom to atom, for with Berzelius he makes the atom of chlorine 221.325.

decomposed by it and converted into a black powder,—the supernatant alcohol becoming acid, but remaining colourless. The bi-chloride dissolves rapidly in alcohol; but the solution becomes acid, deposits a part of the platinum in the form of a black powder, and retains the other part in solution in a new state of combination, which has been ably investigated by Professor Zeise of Copenhagen.*

If the bi-chloride be dissolved in ten times its weight of alcohol, sp. grav. = .832, and the filtered liquid evaporated to one-sixth, the addition of sal-ammoniac causes no precipitate, showing that the solution contains no common bi-chloride of platinum. Evaporated to dryness it leaves a brown mass, which, treated with water, gives a yellow solution, and leaves a brown substance undissolved. The yellow solution evaporated to dryness over caustic potash in vacuo, gives a yellow mass, which is the hydro-carburetted chloride of platinum, and may be farther purified by again dissolving and evaporating.

It may also be prepared by adding to a concentrated solution of hydro-carburetted chloride of platinum and ammonia, a solution of neutral chloride of platinum, drop by drop, as long as a precipitate falls, filtering and evaporating. By this process it is obtained in the purest state.

When pure, this salt is citron-yellow; becoming brown and black in the light. It does not deliquesce, and is slightly soluble in water and alcohol; giving yellow solutions. Heated it gives off muriatic acid and carburetted hydrogen, and leaves a black mass which burns when heated in the air, and leaves metallic platinum.

The aqueous solution when boiled gives off much inflammable gas, and deposits almost the whole of its platinum in the metallic state. Nitrate of silver added to the solution throws down chloride of silver; a black powder then falls, and after this is all separated by boiling, a farther addition of nitrate of silver causes a new deposit of chloride of silver.

From this phenomenon, Zeise inferred that one portion of the chlorine in this salt existed in the state in which it is found in the chlorides, and the other in the same state as in chloric and hydrochloric ether, and, therefore, that the salt was probably a compound of chloride of platinum, and hydro-chloride of carbon (chloric ether.) But in a later paper † he prefers considering it as a compound of neutral chloride of platinum, with olefiant gas, similar to the different species of ether in the following formulæ.

Oxalic ether,	-	$4\,H^2C + C^2O^3 + H^2O$
Sulpho-vinic acid,	-	$4\,H^2C + \ddot{2}\,\dot{S} + {}^2H^2O$ ‡
Muriatic (hydro-chloric) ether,		$4\,H^2C + 2\,HCl$
Chlorine ether,	-	$3\,H^2C + CCl^2$

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* Poggendorf's *Annal.* xxi. p. 506.

† Pogg. xxi. p. 543.

‡ Messrs. Wohler and Liebig consider the sulpho-vinic acid as most probably a compound of hydrated sulphuric acid and ether.—*Ann. de Chim.* xlvii. p. 425.

Cyanic ether -	$4\,H^2C + 2\,N^2C^2O + 4\,H^2O$
Hydro-carburetted chloride of platinum,	$4\,H^2C + 2\,Pt\,Cl^2$ *

Zeise did not determine the composition of this salt by direct analysis, but he inferred it from that of the following compound salts to consist of

1 atom plantinum	= 1233.2600	= 66.528
2 — chlorine	= 442.6500	= 23.879
2 — carbon	= 152.8750	= 8.247
4 — hydrogen	= 24.9592	= 1.346
	1853.7442	100

The different species of ether are considered by Dumas and Boullay as salts of carburetted hydrogen, (olefiant gas,) and in this platinum salt Zeise considers the chloride of platinum to act the part of an acid, and the olefiant gas that of a base. This view coincides also with that of Bonsdorf, who considers the double metallic chlorides as salts in which the chlorides of the electro-negative acts the part of an acid to that of the electro-positive metal.

Hydro-carburetted Chloride of Platinum and Potassium.—If the alcoholic solution of the bi-chloride of platinum be concentrated till a strong solution of chloride of potassium produce no precipitate, diluted with four times its weight of water, filtered and digested upon a quantity of dry powdered chloride of potassium, equal in weight to one-fourth of the dry chloride of platinum employed, till the whole is dissolved and the solution gently evaporated, there are deposited on cooling a crop of beautiful yellow or brownish-yellow crystals, which may be freed from excess of acid by again dissolving and crystallizing. This is Zeise's hydro-carburetted chloride of platinum and potassium. † The salt forms beautiful rhombic prisms, having an angle of 103°.58′, while the angle formed by the lateral and terminal planes is 112°.5′. They belong to the hemiprismatic system of Mohs. They are citron-yellow, transparent, have an astringent metallic taste, redden litmus, dissolve in five times their weight of water, are nearly as soluble in alcohol, and give a yellow solution. Exposed to light and air they become externally of a black colour. By a gentle heat they lose water.—At a high temperature they give off muriatic acid and an inflammable gas, but are not susceptible of entire decomposition by heat. Zeise obtained the platinum by heating the anhydrous salt in a porcelain crucible with carbonate of soda,—estimated the chlorine by dissolving the common salt formed, and precipitating by nitrate of silver, and the carbon and hydrogen by a combustion with oxide of copper. By this process he obtained the following composition :

* These formulæ are all expressed according to Berzelius's atomic weights.

† This salt was first formed and described by Berzelius, but not analyzed.—*Arsberättelse*, 1829, p. 159.

2 atoms	Platinum,	2466.5200	53.157 per cent.
4 ——	Chlorine,	885.3000	19.079
1 ——	Potassium,	489.9160	9.539
2 ——	Chlorine,	442.6500	10.558
4 ——	Carbon,	305.7440	6.589
8 ——	Hydrogen,	49.9184	1.076
2 ——	Water,	224.9600	
		4865.0084	100

And the formula for the dry salt is

$4\,H^2\,C + 2\,P\,t\,C\,l^2 + K\,C\,l^2$, or, as Zeise prefers to consider it, $(4\,H^2C + P\,t\,C\,l^2) + (K\,C\,l^2 + P\,t\,C\,l^2)$

Hydro-carburetted Chloride of Platinum and Ammonium.—If common salt be employed instead of the chloride of potassium in the foregoing process, a solution is obtained which does not crystallize, but if sal-ammoniac be substituted, beautiful prismatic crystals are obtained, similar to those of the potassium salt, and leaving when strongly heated only metallic platinum. The composition of the dry salt is $(4\,H^2\,C + P\,t\,Cl^2) + (N^2$ * $H^8\,C\,l^2 + P\,t\,C\,l^2,)$ and it contains $1\frac{1}{4}$ atoms water.

Ammonia Hydro-carburetted Chloride of Platinum.—When caustic or carbonate of ammonia is added to the solution of any of the above hydro-carburetted chlorides, or when caustic potash is added to the last-mentioned, a bulky yellow precipitate falls, which Zeise finds to be a distinct compound salt, in which caustic ammonia takes the place of the sal-ammoniac in the salt last described. The formula is $(4\,H^2\,C + P\,t\,C\,l^2) + (N^2\,H^6 + P\,t\,C\,l^2)$

The last member of the formula represents the composition of a green powdery compound formerly described by Magnus, and is similar to the compounds of ammonia with the fluorides of silicon and boron.—*Brewster's Journal*, April 1832, p. 328.

Analysis of Gmelinite, by Dr. Thomson.—This mineral seems to have been first discovered by Leman, in the cavities of amygdaloid rocks in the Vincentine. These specimens were analyzed by Vauquelin, under the name of Sarcolite ; and Haüy considers them as mere varieties of analcime. Some years ago the mineral was discovered in the county of Antrim, Ireland, lodged in amygdaloidal rocks, precisely as in the Vincentine. The specimens in my possession were procured from Patrick Doran, an Irish mineral-dealer, who had collected them in this locality. Dr. Brewster gave an account of the physical properties of this mineral in his Scientific Journal, under the name of *Gmelinite* ; and Haidinger has described it under the same name, in an appendix added to his English translation of Moh's *Mineralogy*.

Colour snow-white.

* This is Berzelius's expression for Ammonium, that for Ammonia is $N^2\,H^6$.

All the specimens which I have seen are in double six-sided truncated pyramids, with a short six-sided prism between them. The inclination of the faces of the one pyramid upon those of the other, according to Dr. Brewster's measurement, is 83° 36′.

Translucent.

Hardness 3.5. Scratches calcareous spar, but not fluor-spar.

Lustre vitreous.

Specific gravity 2.054.

Very easily frangible.

Before the blowpipe, swells out and assumes the appearance of an enamel; but does not fuse into a transparent glass.

When exposed to a red heat, it gives out water, and nothing else, and loses 29.866 per cent. of its weight.

5.3 grains of anhydrous hydrolite are composed of

Silica, -	3.015
Alumina,	0.980
Peroxide of iron,	0.625
Potash, -	0.530
	4.95

As hydrolite contains 29.866 per cent. of water, it is obvious, that if the 5.3 grains analyzed had retained their water, the weight would have been 7.53 grains. Consequently the constituents, according to the preceding analysis, considering the loss as potash, and converting the peroxide of iron into protoxide, are as follows:

Silica -	3.015	or	39.896
Alumina, -	0.980		12.968
Protoxide of iron,	0.5625		7.443
Potash, -	0.7425		9.827
Water, -	2.2050		29.866
	7.5050		100

This is equivalent to

14 atoms silica,
4 atoms alumina,
1 atom protoxide of iron,
1 atom potash,
18 atoms water.

We may therefore consider hydrolite as a compound of

4 atoms bisilicate of alumina,
1 atom bisilicate of potash,
1 atom quatersilicate of iron,
18 atoms water.

So that every integrant particle of the mineral is combined with three atoms of water.—*Edin. Trans.* vol. xi. p. 448.

New Hydro-carbon, and Composition of Artificial Camphor, by M. Oppermann.—Artificial Camphor has been hitherto regarded

as a compound of muriatic acid and oil of turpentine; consisting, according to the analysis of M. Houton Labillardiere, of,

Carbon,	76.39	=	15 vols.
Hydrogen,	9.63	=	12 ——
Muriatic acid,	14.07	=	1 ——

M. Oppermann prepared a quantity of this camphor by passing dry muriatic acid gas over rectified oil of turpentine in a long tube, and obtained a crystalline compound, which, after pressure in blotting-paper till it ceased to give out any oil, was nearly equal to one-half the weight of the oil employed. Thenard obtained 110 from 100 parts of oil, Tromsdorf, 26.6, and Cluzel 47,—a fact of great importance, as it shows that oils of turpentine differ very much in composition.

The camphor obtained by M. Oppermann was soft like wax, might be moulded between the fingers at 68°, but crumbled at 50° F. At 104° it sublimes slowly, and forms beautiful, large, and brilliant crystals. The smell is fainter than that of common camphor; the taste weak, but aromatic, and it burns with a bright flame, green towards the edges.

Dissolved in alcohol, it is not troubled by a solution of nitrate of silver, but alkalies decompose it, separating muriatic acid. Common nitric acid does not act upon it, but it is dissolved by the same acid when concentrated.

M. Oppermann obtained the chlorine by passing the camphor in vapour over quicklime heated to redness, dissolving the lime in nitric acid, and precipitating by nitrate of silver. The carbon and hydrogen were estimated by decomposing with oxide of copper. His results were,

Carbon,	72.807	=	23.8	or 24 atoms	=	291.574
Hydrogen,	9.479	=	37.97	or 38 ——	=	37.974
Chlorine,	17.713	=	2	2 ——		70.940
	99.99			And the atomic weight	=	400.488

or it may be stated thus:

Carbon,	72.807	=	24 atoms
Hydrogen,	8.980	=	36 ——
Muriatic acid,	18.212	=	2 ——

The base of this compound is a carbo-hydrogen, in which the hydrogen is to the carbon as 3 : 2.

New Carbo-hydrogen.—When artificial camphor is decomposed by passing it as often as ten times over fragments of quicklime, there condenses in the receiver a clear transparent liquid oil, which becomes white and solid between 50° and 54° F. The heat of the hand melts it. Potassium undergoes no change in it, but when heated in it with contact of air, it forms a dark resinous substance. Fuming nitric and acetic acid, and caustic potash, have no action upon it, but sulphuric acid changes it into a brown resinous substance. Ether,

alcohol, and the carburet of sulphur dissolve it. It possesses a very weak odour, but different from that of camphor, and a mild aromatic taste.

Analyzed by oxide of copper, he found it to consist of,

Carbon,	88.48
Hydrogen,	11.52

To prove that this was the real base of the artificial camphor, it was exposed in a liquid state to a current of muriatic acid gas, when a solid substance was obtained, having all the properties of artificial camphor.

This result explains one cause of the different properties possessed by different specimens of oil of turpentine, and why they should yield unlike quantities of artificial camphor. We have only to suppose that they hold in solution a variable quantity of the carbo-hydrogen above described, and all the anomalies will disappear.—*Annales de Chimie et de Physique*, xlvii. p. 230.

PHYSICAL SCIENCE.

Faraday on Volta-Electric Induction.—Mr. Faraday commenced his experimental illustrations by giving a few apposite examples of ordinary electric induction, shewing that the phenomena are produced neither by the addition nor subtraction of any thing, but by the disturbance of the electricity which the body acted on inherently possesses. He next proceeded to demonstrate the analogy that exists between the intermittent sparks of common, and the continued spark of voltaic electricity. This led him to the proof that electric phenomena might be induced by the galvanic battery as well as by the ordinary electric machine; and the apparatus which he has devised for this purpose displays great ingenuity and philosophical acumen. A coil of wire, such as is used for forming magnets by electricity, has another wire coiled round the same modiolus, but not any where in contact, so that the helix is formed of two spiral wires; through one of these a current of voltaic electricity is sent, and the other, which is unconnected with the galvanic pile, is connected with another helix, in the hollow of which a small rod of iron, or piece of wire, such as artificial magnets are made of, is placed, and then the *volta-electric* induction, from the galvanized to the non-galvanized spiral of the double helix is rendered manifest by the non-magnetic wire in the distant helix being rendered magnetic. The same very curious and important phenomenon was also rendered evident by a newly invented instrument called a *galvanometer*.

To establish the course of the voltaic influence, or as Mr. F. expressed it, the *current*, he showed a very beautiful experiment, in which two magnets were made from iron wires by introducing them

alternately into a helix, the one when the connexion with the voltaic pile was complete, and the other at the moment of the circuit being broken, when the ends thus introduced were found to have opposite poles, indicating the forward progress, and the return of this mysterious power.

Satisfactory as the above evidence must be admitted to be of the point in question, Mr. F. did not rest content with what would have satisfied almost any body else, but as he had shewn the reality of volta-electric induction, and the formation of magnets being induced by voltaic electricity, he reversed the experiments, and made magnets themselves the subjects of investigation, and succeeded, as he informed his much interested auditory, in obtaining from them a spark, similar to the spark of common and galvanic electricity.—*Medical Gazette, Feb.* 25, 1832.

Ritchie on the Theory of the Pile.—Dr. Ritchie gave an ample account of his views of voltaic action. He paid a high tribute to the researches of Sir Humphry Davy and Mr. Faraday on the subject, and dwelt on the immense importance of Volta's discoveries in revealing the mysteries of nature. Before he proceeded to investigate the laws of the compound battery, he took occasion at some length to explain to his audience the principles upon which his torsion galvanometer is constructed—an instrument by which, through the elasticity of fine glass threads, some of the most delicate motions in nature can be appreciated. It was frequently employed in the course of the evening to illustrate certain positions laid down by the professor. The ordinary explanation of the appearances presented by the action of the simple Voltaic battery is founded on the assumed *decomposition* which takes place, in consequence of the greater affinity which one of the metals manifests for oxygen than the other; but Dr. Ritchie maintains, that the phenomena are wholly owing to a *change of place*, which is effected among the molecules of the fluid employed. This he endeavoured to render conceivable to all present, by an ingenious though homely contrivance of a plane representing the plate of metal used in the battery, and a row of white and black spherules on either side of it, standing for the elementary molecules of the fluid in which the metal was supposed to be immersed. Volta's theory of the contact of dissimilar metals he also undertook to disprove as erroneous, and to shew that the phenomena were consequent upon the separation of the metals, not their contact: nor need the metals be dissimilar, as Dr. Ritchie shewed, for he produced considerable action by the employment of two copper spirals, one fitting into the other; and also by using two disks of the same metal, one hot and the other cold, with the addition of a little weak acid. The cold disk, we may observe, exhibited indications of being (so to speak) positive, the hot of being negative; and Dr. Ritchie took occasion to point out the advantage of using hot water in place of cold, in preparing the battery; it increases its energy in the ratio of no less than two to five. He denied the propriety of applying the terms positive and negative to the indications

of voltaic agency; and he went farther; he disputed the inference from Dr. Wollaston's celebrated experiment, and shewed that it was defective as a proof of the identity of voltaism and common electricity. In conclusion, the learned Professor proved, by the composition of ratios, various laws of the compound battery; in particular, he demonstrated that the powers of those batteries varied directly as the square roots of their number of plates, This, as well as his other conclusions, he verified by experiment, the results being registered by his torsion galvanometer. Of two batteries which were used, one of 120, and the other of 30 plates, it was shewn that the energies were not in a higher ratio than as two to one.—*Medical Gazette*, March 3rd, 1832.

Thermo-electric Observations of Muncke.—M. Muncke having observed that the beam of a Coulomb's torsion balance, placed on a table near a window, made automatic movements, assured himself by accurate experiments that these motions did not arise from currents of air, but from electricity developed in the glass plate by variations of temperature. This phenomenon induced him to put the following question, may not the ice which covers so large a portion of the globe, be susceptible of becoming electric by the action of heat? And having succeeded in answering in the affirmative, he extended his researches to other substances, which compose the superficial crust of our earth. The clay employed in potteries gave him similar results. The precautions which he has taken to avoid all foreign influence, and the constancy with which he has pursued his experiments, merit the greatest praise.

En resumé, we may deduce from the experiments of M. Muncke this important conclusion, that the daily change of temperature, and particularly the influence of the solar rays, developes electricity in the substances cited. It is then natural to conclude, that ice, clay, and all the analogous substances which constitute the surface of our globe, produce the same phenomena under the regularly alternating influence of the solar rays. The electric excitation thus produced, is necessarily feeble in each locality considered isolately, but when we regard the great masses of matter put in action, it becomes evident that the whole result must be of considerable energy.—*Annalen der Physik und Chemie*, tom. 20, s. 417.

Thermo-multiplier.—The thermo-multiplier is a kind of instrument, which renders evident the most feeble sources of heat. To give an idea of its extreme delicacy, it is sufficient to mention, that it is affected by the natural heat of a person 25 or 30 feet distant from it.

The principal pieces which compose the thermo-multiplier are, 1st, a thermo-electric pile; and 2d, a galvanometer with a double needle, particularly sensible to thermo-electric current. The first part of the apparatus constitutes the real thermoscope, the latter is merely the index of the effect produced. Heat excites in the pile electric currents; these currents pass by two metallic wires, which connect the two parts of the apparatus, are transmitted to the galvanometer,

and influencing the magnetic needle, make it deviate from its natural equilibrium to a degree corresponding to the intensity of the heat employed.

According as the thermo-multiplier is intended to be used for experiments on radiant heat, or on that agent conducted through the solid particles of bodies, its surface must be differently disposed. In the former case, the surface of the pile is painted with lampblack : in the latter it remains bright.

In the instrument laid before the Institute by M. M. Nobili and Melloni, the thermo-electric pile was formed by 38 elements of antimony and bismuth in flattened prisms, soldered together alternately at very acute angles, so as to form a continuous metallic chain, disposed in different metallic ranges, communicating by their nearest extremities. These ranges are of different lengths, in order to retain them in a circle which embraces them all in their middle line. In this disposition the odd solderings 1.3.5. &c., are placed on one side, and the even 2.4.6. &c. on the other, they form the *faces* of the pile.

Those who know the nature of thermo-electric piles and the mode of putting them in action, will immediately understand the action of the apparatus. The communications with the galvanometer having been established, if the temperature be equal on both sides, the electromotive forces do not change, and the index does not enter into motion; but if the least variation in temperature take place in one face, while the heat of the other is not changed, we obtain currents of electricity which run through the metallic circuit; and the needle of the galvanometer immediately deviates in one or other direction, according to the force and nature of the thermometric variation.—*Annales de Chimie et Physique, Oct.* 1831.

M. M. Nobili and Melloni have communicated a number of most interesting observations made by means of this instrument, which we shall notice at length in a subsequent number.

Simple Rain-Guage.—A Rain Guage proposed and used by Mr. Adam of Inverness, consists of—1st, a square mouthed filler, to collect the rain water, having the length of each side of its mouth equal to 10 inches, or its superficial area equal to 100 square inches, and about half an inch of its mouth bent up, so as to prevent any part of the rain entering it from being afterwards blown out by wind. Its throat is closed, with exception of 10 or 12 small holes, each about $\frac{1}{8}$th of an inch in diameter, to permit the descent of the rain water, and to retard its escape by evaporation. 2d, A large bottle which admits into its mouth a part of the tube of the filler, and is large enough to contain all the rain water which may thus enter it in the course of twelve hours. 3d. A cylindrical glass tube having its inside diameter about $\frac{1}{2}$ or $\frac{2}{3}$ds of an inch, its lower extremity hermetically closed, its upper extremity funnel-shaped, so that the rain water to be measured may be easily poured into it from the bottle; and one of its sides accurately graduated into portions, having the capacity of cubic inches, and tenths, &c., of a cubic inch.

4th, A post fixed vertically in a sheltered situation, and having, 1st, a horizontal shelf perpendicular to it, about two or three feet above ground, to support the bottle; 2d, a bent iron hoop fixed to a post, and so as to hold the bottle firmly in its place when exposed to storm; and, 3d, two strong wire hold-fasts, screwed into the post, and formed so as conveniently to hold the graduated glass measure, that it may be always ready to ascertain the number of cubic inches, and tenths, and hundredths of a cubic inch, of the rain water which has entered the bottle, and consequently also the depth of rain which has fallen in the adjacent country in hundredth, thousandth, and ten thousandth parts of an inch.

Explanation.—The superficial area of the mouth of the filler being 100 square inches, it is obvious that 100 cubic inches of rain water must pass through it into the bottle, when one inch deep of rain falls in the adjacent country; that every cubic inch of this water, being the hundredth part of the whole, must indicate the hundredth part of an inch deep of rain; and that every tenth and and hundredth part of a cubic inch of such water, measured in the graduated glass tube, must likewise indicate the thousandth and ten-thousandth parts of an inch deep of rain. If the inside diameter of the cylindrical glass measure be only half an inch, the circular area of a section of it, viz. $(\frac{1}{2})^2 \times .7854 = .19635$, or nearly $\frac{1}{5}$th of a square inch, will be contained 509 times in 100 square inches, the area of the square mouth of the filler. And as the depths of square and cylindrical measures of equal capacity are inversely as the areas of their bases, it is clear, that to measure 100 cubic inches of rain water, which may be contained in one inch deep of a square mouthed measure, whose side is 10 inches, there will be required a depth or length of 509 inches of the cylindrical glass measure, whose diameter is only half an inch. Consequently the hundredth part of this length, or five inches and nearly $\frac{1}{11}$th of an inch of it, will be required to contain one cubic inch, or to measure the hundredth part of an inch deep of rain. Half an inch of it will be required to contain $\frac{1}{10}$th of a cubic inch, or to measure the thousandth part of an inch deep of rain; and consequently the $\frac{1}{10}$th part of $\frac{1}{2}$ inch, or $\frac{1}{20}$th of an inch of this measure, will be required to contain the hundredth part of a cubic inch, or to measure the ten-thousandth part of one inch deep of rain. If a similar measure, $\frac{2}{3}$ds or $\frac{3}{4}$ths of an inch in diameter, be graduated in the same manner, the divisions, even when carried only to tenths or to twentieths of a cubic inch, are sufficient to enable a careful observer to determine the depth of rain fallen around the guage to the ten-thousandth part of an inch. Because by inspection, he can easily judge of the tenth or the fifth part of the smallest division on the scale; which tenth or fifth, being about $\frac{1}{40}$th of an inch in length, indicates the $\frac{1}{100}$dth part of a cubic inch, or the ten-thousandth part of a depth of one inch of rain. Here it is obvious that the metallic filler, and the graduated cylindrical glass measure, are the principal parts of this rain guage; that its value depends on the accuracy with which these parts are constructed; and that it may be very accurately made at half the ex-

pense of the common and patent rain guages, which show the depth of rain falling around them only to the hundredth part of an inch.—*Jameson's Journal, April*, 1832.

Change of Volume in Mixtures of Alcohol and Water.—It is already known that the volume of a mixture of two heterogeneous liquids is never equal to the sum of their volumes. The change of volume varies with the proportions in which the liquids are mixed, and consequently attains its maximum, in a mixture which generally appears to be formed by simple atomic relation, between its components. Dr. Ure had already proved, that the greatest contraction of the mixtures of sulphuric acid and water took place when the oxygen was equally divided between them. A similar result has been found to take place with regard to alcohol and water, by M. Rudberg; the maximum of the contraction takes place when the two liquids are mixed in such proportions, that the oxygen of the water is to that of the alcohol as 3 to 1.

The following table contains, in its first column, the volumes of absolute alcohol, that of the mixture being represented by 100; in the second, the specific gravities of the mixtures; and the third column shows the contractions in hundredths.

PER CENT.	SPECIFIC GRAVITY, AT 15° CENT.	CONTRACTION.
100	0.7947	0.00
95	0.8168	1.18
90	0.8346	1.94
85	0.8502	2.47
80	0.8645	2.87
75	0.8779	3.19
70	0.8907	3.44
65	0.9027	3.615
60	0.9141	3.73
55	0.9248	3.77
50	0.9348	3.745
45	0.9440	3.64
40	0.9523	3.44
35	0.9595	3.14
30	0.9656	2.72
25	0.9711	2.24
20	0.9661	1.72
15	0.9812	1.20
10	0.9867	0.72
5	0.9928	0.31
0	1.0000	0.00

Annales de Chimie et de Physique, September 1831, p. 33.

BOTANY AND NATURAL HISTORY.

Secretion of Water by certain Plants.—Professor L. C. Treviranus of Breslau, has lately given his attention to the subject of the watery secretion of the leaves of plants. The Nepenthes, Sarracenia, and Cephalotus have long afforded the most striking examples of this function. Rumple's observation, that the water of the tankard-shaped leaves of the N. distillatoria is always pure, militates against the supposition, that it comes from without. He also remarked, that when the lid of the N. Phyllamphora is open, the water is diminished one-half by solar evaporation, which, however, is restored at night. The structure of the goblet-like leaf, as observed by Treviranus, is like an actual secreting organ, and adds a strong reason for thinking, that the plant supplies the water. He finds the parietes of the leaf of N. distillatoria traversed by a multitude of proportionably large anastomosing veins, which contain many true spiral vessels. The upper half of its inner surface is covered with a blue rind, as parts are often which are to be protected from the action of water; the under half is, on the contrary, shining and full of small gland-like eminences, directed downwards, and having a hole almost visible with the naked eye, which is uncovered with the cuticle, which the remainder possesses. Through these he thinks is the water secreted, and it reaches generally to their level in the middle of the leaf; it is remarkable, that the inner or under surface of the lid, exhibits a similar structure, but whether it also secretes water, future observation must discover. Sir J. Smith's remarks on the construction of the lid of the Sarracenia flava and adunca, are sufficient to invalidate Linnæus' opinion, that the leaves of this genus, as well as the nympheæ, were intended as natural reservoirs for rain water. In the Sarracenia there is no particular apparatus as in the Nepenthes, for the secretion. Macbride's observations demonstrated on the edge of the sarracenia adunca, a sweet substance that allures insects, which, creeping into the funnel of the leaf, arrive at the water, and being hindered from returning by the hairs directed downwards, are drowned. It is reserved for future investigation, to discover what gives the sweet taste to the Nepenthes, and Cephalotus, which is mentioned, and how the insects are killed, as nothing appears to hinder their creeping out again.

Treviranus has examined particularly the watery secretion of the Amomum Zerumbet, which was not noticed by any botanist, except cursorily by Murray. The spikes stand on a stalk a foot and a half long, rising from the root, and are the size of a hen-egg, or sometimes as large as a goose-egg; they consist of a great number of broad deep scabs which lie over one another, imbricated, and enclosing a space between them. The scales are of a leathery consistence, each of them enclosing a small colourless flower, of a more cuticular

nature. At the commencement of the flowering, the spikes are full of clear water, which is nearly without smell or taste. By gentle pressure, it comes from between the scales, and if it be emptied in the evening, it becomes in great part renewed by morning. The lower half of the scale which contains no flower, is found as full of water as the rest. Treviranus, therefore, considers the inner inferior part, where the scales are connected with the stalk, the place where the water proceeds from. The water lasted during the whole flowering time, that is three weeks, but as it advanced, it did not preserve its original pureness; it became somewhat ropy, and got the smell of the bruised leaves of the plant, without, however, losing its transparency in the least. Dr. Göppert subjected a portion of it to chemical analysis, from which it results, that the fluid between the scales of the spikes of the Amomum Zerumbet, consists of pure water, containing a small quantity of vegetable fibrine, and mucus; the quantity of which last, is different at different periods of the flowering time.

He has also observed a tasteless water in the corolla of Moranta gibba.—*Treviranus and Tiedemann, Zeitschrift.*

Influence of Musk on Vegetation.—Dr. Goppert of Breslau, having ascertained the curious fact, that all odorous vegetable principles, as the essential oils, camphor, &c. have an extremely noxious effect on vegetation, arresting totally the development of plants with which they come in contact, and finally killing them, was desirous of ascertaining whether the odorous animal substances would have a similar effect; for this purpose he used musk. The vegetables were exposed to its action in two ways; either the roots of the plant were moistened with water, holding musk in solution, or else the whole plant was exposed to the exhalations of a considerable quantity of musk for a long time, generally, until the plant grew so large, as to render it necessary to stop the experiment, the vessel used being too small to contain the plant.

In no case did this animal substance appear to exert any injurious influence on vegetable life. A great number of plants of different classes were experimented on, but all with similar results. He found, however, that the plant, although taking up the water in abundance, did not absorb any of the musk which existed in solution, nor did the tissue of any of the vegetables exposed to its action, exhale its characteristic odour.

He also determined, that those parts of plants, as the cicatricula of the Berberis, the leaf of the Mimosa, &c., which possess motion, and a kind of sensation, did not lose these vital properties, by the action of musk.

He reasons from this inertness of musk, that the opinions concerning the nature of its odorous principle cannot be correct; Guibourt considering it to depend on a volatile oil, and Buchner on carbonate of ammonia; the exhalations from both which substances are highly noxious to the life of plants.—*Zeitschrift für Physiologie,* 3 Band. 2 Heft. p. 269.

Mode of Action of the Pollen on the Stigma.—M. Amici has announced, that the circulation of the prolific liquid in the little bladders of the pollen, may be observed in a great number of plants, as the *hibiscus trionum, gladiolus communis,* and particularly in the *yucca,* and the *hibiscus syriacus.* He indicates the means of succeeding in observing the pollenic grains introduced into the stigmata of the *yucca,* means, which consist principally in cutting suitably a slice of the stigma, and in placing this latter between two plates of glass; but it is necessary to be careful in making the section, for if it be too thick, it demands, to become transparent, such pressure as lacerates the organs of the stigma, and if, on the contrary, it is too thin, the bladders of pollen that it contains, are subject to be cut across, particularly if the pollen has sojourned long in the stigma, and the bladders have penetrated very deep. As to the *hibiscus syriacus,* it is not necessary to cut slices from off the stigma, as the entire organ is small enough to be placed in the field of the microscope.—*Ann. des Sciences Naturelles,* Nov. 1830, p. 329.

Faraday on the Planariæ.—From Dr. Johnson's experiments it appears, that if an incision be made longitudinally into the head of the animal, so as to separate its eyes from each other, if the cut has not been carried very far down, it will heal in the ordinary manner; but if the head be absolutely cleft in twain, then, according to the the extent of the fissure, there will be a mass of new matter formed by each half of the head, which will either join the two halves together, forming a head of extraordinary size, and bearing in it one or two additional eyes; or each old half, thus cleft, will form the new matter into another half, with an eye, and so the animal have two complete and entire heads. If the fissure be carried farther down through the body of the animal, then not only will there be two heads, but two bodies also formed, joined together only by the tail, and when this is the case, so little unanimity does there exist between these *siamoid* twin-planariæ, that they never pull or swim the same way, and so violent are their efforts that they frequently, in the course of two or three days, tear the only remaining bond of union, their tail, in sunder, and then two distinct and perfect animals result.

If in a common planariæ the head be cut entirely off, a new head will be formed; and if their lower extremity be removed, it will produce a new tail. In a planaria, which, by the operation above described, had been invested with two heads, these "nova capita" were successively severed for three several generations, and were immediately and perfectly renewed, and subsequently the animal was cut through just below the artificial bifurcation, and then only a single head was produced, so that in this more than simple "capital" operation, a single-headed animal became a biceps, and after having had the use of six heads in succession was subsequently reduced to the possession of a single one.

When one of these animals is cut in half, the head or anterior

extremity swims away as if nothing had happened, and speedily re-tails itself; but the tail swims to the bottom, and remains torpid for two or three days, by which time it has formed for itself a head. If a planaria be cut into three pieces, the head will form a new body and tail, the tail a new body and head, and the middle section or body will produce both head and tail. If a quarter be removed by making a longitudinal incision through the head, and half down the body, and then a semi-transverse cut to remove the upper quarter, not only will the three remaining quarters speedily re-produce a new fourth, but also the separated fourth will form to itself three new quarters. Indeed a planaria has heen cut into as many as ten pieces, and each piece has become an entire and perfect animal. In fact this mode of propagation, which physiologists artificially institute, seems to be frequently resorted to by the animal itself. The planaria felina has been seen to throw off pieces of its body to form new animals, and these are not diseased but healthy parts, and not only parts of its tail, but often offsets from its sides, &c. Indeed, the planaria felina and P. arethusa have been never known to lay eggs, whilst the torva, lactea, &c. lay them in abundance, both the original animals, and those artificially produced. It would seem that those species which inhabit springs and running waters propagate only by division; but those which dwell in ponds and ditches, where the water is occasionally exhausted, are oviparous, as well as viviparous.

The above facts are physiologically curious, as they shew a still closer affinity than had previously been supposed to exist between the propagation of plants and animals by cuttings as well as seeds, for they have shewn that this mode of propagation can be carried to an almost equal extent in the one as in the other—an extent to which the experiments of Trembley and others on polypi, starfish, &c. &c. did not reach.—*Medical Gazette, Feb.* 11, 1832.

ANATOMY AND PHYSIOLOGY.

Passage of Fluids from the Arteries to the Veins.—In the uncertainty in which physiology has been left by actual experiment, as to the time which the ultimate particles remain as constituting the actual tissues, until they are replaced by new molecules, many opinions have been proposed, which, as they are circulated unsupported by experiment, have remained uncontradicted by it. Professor Willbrand has, in late times, become the author of one of these dogmatic postulates, which from its departure from all common notions, has attracted much attention. He believes that the arterial blood having arrived at the capillary system, becomes instantly a part of the tissues, and that in the same instant, the old molecules are taken up by the veins; thus the venous blood is a new production, and not the

fluid that circulated in the arteries. According to this idea, every animal having a circulation is momentarily being changed into a new animal.

Dr. Mayer, of Bonn, has submitted the most tangible proposition which this hypothesis contains to the test of experiment; namely, that there is no actual passage of the blood from arteries to veins during life. The first experiment on this subject he made several years ago, and has frequently repeated it with the same result. He introduced with a mercury injecting apparatus, $3\frac{1}{2}$ drachms of quicksilver, into the right jugular vein of a robust rabbit in a continued stream. After four minutes the animal died in convulsions. On dissection, the greatest part of the mercury was found mixed with the blood in the inferior vena cava, in the hepatic and hypogastric veins; he saw few globules in the right ventricle, more in the pulmonary artery, less in the pulmonary veins, very little in the left ventricle, a considerable quantity in the thoracic aorta, some in the coronary arteries of the heart, the abdominal aorta, the renal arteries, and even some globules in the left cerebral artery. The lungs contained most mercury after the liver. In this experiment, a heavier fluid than blood passed from the arteries into the veins in both the pulmonary and aortic systems.

If the nature or weight of this fluid were objectionable, as making a passage by pressure, experiments which he has made lately with milk settles this point. He poured into the jugular veins of rabbits a quantity of cow's milk, (from three to four ounces,) and after some minutes killed the animals. He found not only the right side, but also the left side of the heart and the aorta, and the venæ portæ, filled with the milk. Thus, a fluid similar in physical and vital properties to the blood, passes with ease immediately from the arteries of the lungs into the pulmonary veins, from thence into the whole arterial system, and again from the arteries into the veins. There exist then, concludes Dr. Mayer, open canals, through which this passage takes place, and through these the blood passes without impediment.

It is remarkable how little disturbance the animals suffer from the introduction of milk into their circulation. The spleen was by no means filled with it, as those should think who believe its function to be to receive from the chyle and milk-like parts from the blood for more perfect hæmatosis. These experiments succeed best, if some blood be abstracted from the animal before the introduction of the milk.

Dr. M. purposes instituting experiments, to determine how long animals can live with the greatest possible quantity of milk in their circulation, hoping to derive some favourable results as to the use of such infusions in some morbid conditions, for example, the last stage of phthisis, scurvy, typhus, hydrophobia, poisoning from the bite of the crotalus and other snakes, &c.—*Zeitschrift für die Physiologie.*

Rapidity of the Circulation, and of Secretion.—Professor Hering of the Veterinary School at Stutgart, has recently made some very interesting researches, to determine more accurately the velocity with which the blood is carried through the vessels, and also to ascertain the rapidity with which substances are separated from the body.

His mode of operating was as follows: he introduced a solution of ferro-prussiate of potash in water into a blood-vessel, not by injection, which would vitiate the results, but by putting the liquid into a funnel connected with the blood-vessel; it entered into the circulation in a few seconds, without any external impulse.

Horses were used in his experiments, which were very numerous, and carefully performed; the results alone our space permits us to insert.

1. The solution having been injected into the jugular vein of a horse, was detected by a persalt of iron, in the blood taken from the vein of the opposite side, at the expiration of from 20 to 25 seconds.

2. The solution passed from the tracheal vein to the masseteric artery of the same side, in from 15 to 30 seconds, and from the same vein to the external maxillary artery, in from 10 to 15 in one, and in from 20 to 25 in another experiment.

3. And from the jugular vein to the metatarsal artery, in from 25 to 30 seconds.

In these experiments, the motion of the blood depending upon the same causes as the motion of the fluid introduced into it, it must be allowed, that the rapidity with which the fluid passes through the vessels, represents accurately the velocity of the circulation. Professor Hering does not consider that the acceleration or the retardation of the pulsation of the heart, alters the velocity of the mass of blood, as he found that the time after which the prussiate of potash was detected in remoter parts of the vascular system, was the same in numerous cases, presenting the most discordant numbers of pulsations of the heart in a minute.

He detected the foreign salt in most of the secretions; it appeared in the fluid of the serous membranes after different spaces of of time, according to their distance from the centre of the circulation; the first in the pericardium, then in the secretion of the pleura and peritoneum, and last of all in the synovial membranes; the quantity of salt separated however, depended solely on the extent of secreting surface. The shortest time after the introduction of the salt that this latter was found in the serous cavities, was two minutes.

The secretion by the mucous was less rapid than by the serous membranes; however, the salt was found on the surface of the stomach a very few minutes after its introduction into the jugular vein.

On account of the dark colour of the liver, spleen, &c., it was difficult to ascertain the presence of the foreign substance in them; unequivocal evidence of it was met with in the salivary glands.

Marked traces of the prussiate of potash were found one minute after its introduction into the blood, in the kidneys, as well in the cortical and tubular part, as in the fluid existing in the pelvis: it was also traced in the tissue of the urinary bladder.

The shortest time required by the prussiate of potash to pass into the thoracic duct is not well ascertained; in different experiments it was discovered in that vessel in one, two, and five minutes after its introduction. It is not found in the lymphatic glands, until some time after it appears in the lymphatic vessels, and Professor H. considers that there is a communication between the arteries and lymphatics, by which substances pass into the former from the latter, without being previously secreted, and then absorbed.

It is evident, that foreign substances introduced into the circulation, are carried along and separated from it, much more rapidly than we had hitherto believed. Professor Hering intends communicating in a subsequent paper, his researches on the rapidity of absorption.—*Zeitschrift für Physiologie*, Band. iii. 1st. Heft. p. 120.

Comparative Temperature of Whites and Negroes.—In a manuscript memoir on his voyage to Central Africa, presented to the Academy of Sciences by M. Douville, he has mentioned some experiments on the difference which exists between the temperature of these two races, according to age, sex, &c. These experiments, although in some points imperfect, are in many, highly interesting. The researches were made in Africa.

M. D. ascertained the temperature of a number of persons at 7 o'clock, A. M., before they had been exposed to the sun. Some of the results follow:

1. A white,	-	aged 12 years,	= $29\frac{1}{4}$	Réaumur.
2. A negro,	-	—— 12 ——	= $31\frac{1}{2}$	——
3. A white,	-	—— 20 ——	= 29	——
4. A negro,	-	—— 20 ——	= 31	——
5. A white-woman,		—— 14 ——	= $29\frac{3}{4}$	——
6. A negress,	-	—— 14 ——	= $32\frac{1}{4}$	——

Whence results that, *cæteris paribus*, the negro possesses always more animal heat than the white. M. Douville considers that there is a relation also between the developement of heat, and of the intellect. Thus the temperature of

1. A stupid, slothful negro, -	aged 18 years,	= $29\frac{11}{12}$	R.
2. A lazy negro, - -	—— 18 ——	= $29\frac{8}{12}$	—
3. An intelligent negro, -	—— 18 ——	= $29\frac{4}{12}$	—
4. An active and intelligent negro,	—— 18 ——	= $29\frac{1}{12}$	—

As the passions of the negro cool with age, he loses a great deal of this excessive heat. He grows old very soon, and at thirty is as aged as an European at fifty-five or sixty years. It is rare to meet a negro older than forty years; but still the old negro has a higher temperature than the white in his prime of life.

It results from the researches of M. D., that the temperature of

the negro is *cæt. par.* much superior to that of the white; that the heat of negresses is greater than that of negroes up to the fifteenth year of their age, but after that period, less, but still greater than that of whites; that the negroes diminish in temperature as they grow old, and finally, that the old negroes have still a higher temperature than the whites.—*Journal de Chim. Med. Fevrier*, 1832, p. 97.

Arrangement of the Venous System in the first Stage of Existence.—In examining four embryos of the sheep whilst very imperfectly developed, M. Rathke recognized that the venous system presented a striking analogy with that of the embryos of the blennius viviparus. (Long since, the author had described the peculiarities of the venous system in the embryos of this fish.) This analogy determined him to make a series of researches on the fœtus of the sheep and pig, in order to ascertain the changes which the veins undergo successively before attaining their definitive form. His results are as follows:

The sheep has primitively two posterior venæ cavæ, of which the right, the longest, comes from the posterior extremities, and the left arises from the posterior extremity of the left renal capsule. The hepatic veins terminate in the trunk of the right side. There are also two anterior cavæ descending from the head, and resembling in all respects. Before opening into the auricle, (which is at yet single,) these four venæ cavæ terminate in a common trunk, curved with the convexity downwards, and towards the heart. The two posterior cavæ reunite a little before entering into the common trunk.

This disposition does not remain long in the embryo of the sheep. The trunk in which the four cavæ terminate, shortens, and soon totally disappears, so that the veins then open directly into the auricle. As soon as the branchiæ have closed (for we know that these organs exist in the mammiferæ, in the earliest period of fœtal life) the two anterior cavæ form a large anastamosis towards the lower part of the neck; one of these veins, which is the right, increases in development in consequence of this anastamosis, and the portion of the left vein between the anastamosis and the heart, ceases to grow, and finally disappears, while the blood which it conducted from the left side of the head and neck, returns by the left jugular vein.

As to the two posterior cavæ, that of the right increases in size, and becomes permanent, whilst that of the left side remains arrested, and forms the semi-azygos, for the real azygos is absent in the sheep and pig.

All these facts become of interest when they are susceptible of applications. Thus, certain mammiferæ, (as the hedge-hog and the rat,) retain all their lives two anterior cavæ, and the existence of a similar formation has been observed in man, although very rarely.

In the second part of his memoir, M. Rathke is occupied on the development of the lungs. This writer had advanced in the Actæ Naturæ Curiosorum Naturæ Bonensis, for 1828, that the lungs of

mammiferæ form originally but a single mass, which afterwards separates into two lateral halves. However, later researches on the embryo of the sheep have convinced him, that this is not perfectly true, but that each lung consists at a certain period of development, of a simple bladder, with thick smooth parietes. At a later period, these two lungs approach, and contract between them a red adherence through their whole length, and it is this second state of development which he before mistook for the first. Thus, Meckel is right in supposing, that the simple vesicular lungs occasionally met with in human monsters, is a consequence of arrested development.—*Archives für Anatomie und Physiologie*, Jan. March, 1830, p. 63.

Presence of Entozoa in the Eyes of Animals.—Hitherto, worms have been seldom, and in small numbers, found in the eyes of animals. M. Nordman has, however, met with them in all the eyes of fishes, reptiles, and birds. In the summer of 1829 he met with an immense number in most fishes. It is particularly in the vitreous humour, near the campanula halleri, and even in the crystalline lens that he has observed them in groups of from 60 to 100 individuals. They are generally of a new genus, of the nematodes; he has also met with two new Distomas, contained, as he says, in hydatids, and finally, very rarely a species of Cupularis.—*Jour. für Chir. und Augenheilk*, tom. xiv. 656.

PATHOLOGY AND THERAPEUTICS.

Cephalæmatoma Neonatorum.—In the posthumous medical papers of Dr. Griesselich of Schwetzingen, there is a valuable set of "observations on the bloody tumour of the scalp in infants," from which the following deductions are made:

1st.—He agrees with Baudeloeque, that this tumour must frequently be considered as a salutary derivation of the blood from the brain, by which internal extravasations, &c., are averted.

2nd.—Two circumstances appear to play essential parts in most cases as *exciting causes*, either general accumulation of blood in the head, or contusion of the pericranium, or laceration of some of its blood-vessels, during parturition.

3rd.—Accurate observation of the firm raised margin which circumscribes the tumour, proves that it is not derived, as some writers, Zeller in particular, (de cephalæmatomate,) suppose from the injured bone, but is formed by the cellular tissue connecting the cranium to the pericranium becoming inflamed and swollen at the circumference of the bloody effusion.

4th.—The best treatment is to open the tumour as soon as pos-

sible, a long, free incision is the best, it is the least likely to require repetition. It is better, however, to repeat the incision, than to keep open the wound by tents. In emptying the tumour, it is important not to stroke or knead it, but to use an equal pressure from the circumference towards the opening.*—*Rusts Magazin, für die Gesammte Heilkunde*, 1831.

General Dropsy.—Solar Medication.—A man was exposed to cold and damp, which immediately stopped the cutaneous transpiration, and caused a chronic scaly eruption which had been for many years constitutional, to disappear. This was soon succeeded by general anasarca, and ascites, the fluid of which was of a gelatinous nature, the œdematous parts having a peculiar tough hardness. It continued some months without any evidence of visceral disease. The appetite remained good, and the pulse slow. After the fruitless use of many remedies, Dr. Griesselich ordered the patient to be exposed, during the month of May, to the burning rays of the sun for several hours daily, in a place secured from air currents. The man was quite cured in fourteen days by this means, and the skin-eruption restored.—*Rusts Mag.*, 1831.

Periodic Blue Disease.—Dr. G. was called to see a girl 24 years of age, having all the appearance of poisoning by opium, which a surgeon had administered to allay an attack of hysteric colic. He removed these by coffee, vegetable acids, &c. But from this time commenced symptoms of diseased heart. Any cause which disturbed this organ, caused the usual symptoms of morbus cordis, with extraordinary blueness of the face. This was, however, transitory. After some months, the disease suddenly increased, and the symptoms, including the blueness, returned. The tongue, lips, and tops of the fingers appeared as if stained with bog-berries; the conjunctiva streaked purple, and sleepless orthopnæa set in. This attack lasted eight or ten days, after which, the violent symptoms, together with the blueness, disappeared. In the course of some months this returned, and vanished several times. Finally, she died from apoplexy, and there was no opportunity by post mortem examination, to investigate the state of the heart, which caused this singular intermitting disease.—*Rusts Mag.*, 1831.

Sanative Effects of Vaccination.—In the year 1827, Dr. G. vaccinated a boy nine months old, who was atrophied to an extreme degree. With difficulty the mother was persuaded to submit to it, when he represented to her the probable cure of her child. On the 9th day six fine pustules (qu. vesicles) were matured. "On seeing the child several months after," says the Doctor, "I scarcely recognized the fine boy who was grown, without any other means, into a model of the most perfect health."

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* Dr. G. supports his views by some interesting cases, and good arguments.

Two other cases, one an infant fourteen months old, atrophied from birth, and despaired of by its parents; the other, a scrofulous Jew-boy, who was attacked from the first week with ophthalmia and eruption, presented equally striking effects. They were both perfectly cured, and their constitutions apparently changed by the use of vaccination alone.—*Rusts Mag.*, 1831.

Total Absorption of the Placenta.—A woman aged 30, was safely delivered of a male child (her first) on the 5th of September, 1830, at two P. M. The after birth not coming away, a physician was sent for, who, on his arrival, found that there was very little hemorrhage, and that the uterus had contracted, though not sufficiently to expel the placenta, which remained firmly attached to its upper portion towards the left side. He repeated his visit at ten in the evening, but still did not observe any symptoms which he conceived would warrant him in attempting to detach the placenta by artificial means. Next morning, at six o'clock, he found the patient coming on very well in every respect, except that the placenta had not yet been expelled; and when another medical man who met him in consultation, introduced his hand into the uterus to detach it, he found it adhering so firmly, that he did not venture to persevere in the attempt. On the 7th, there were strong symptoms of fever; there was also a tenderness in the left iliac region; and there had been no milk secreted. On the 8th, there was an eruption of pemphigus in various parts of the body. Several attempts were made to detach the placenta, but in vain; so they were given up altogether. The patient now appeared in a state of great danger; she was exceedingly weak, and felt a constant faintness; her pulse was very frequent, and scarcely perceptible; she had alternations of chilliness and flushing; her breath was fetid; she lay in an almost comatose state; and the lochia were sparing and had a loathsome and exceedingly penetrating odour. For upwards of a fortnight she continued much in the same way, with the exception of the eruption, which gradually disappeared. She then began to recover, and in six weeks was convalescent. The catamenia commenced on the tenth week after delivery, and returned regularly afterwards; but though the discharge was always attentively examined, there was never the least vestige of the placenta perceptible. The lochial discharge had all along been examined with equal care, but the result was the same. The uterus and os uteri have since been ascertained to be quite natural as to size and form, &c.

The treatment chiefly consisted in injections into the uterus of infusion of chamomile, and afterwards of infusion of bark with some wine in it, and the internal exhibition of decoction of bark. The patient was occasionally allowed a little wine.—*Rusts Mag.*, 1831.

Diosma Crenata in Cholera.—Dr. Magnus, of Riga, states that he has employed buchu with great success in cholera. He had read somewhere that a missionary had recommended it strongly; and ac-

cordingly he determined to give it a trial, for which he had great advantages, having a cholera hospital under his care. His first trial was upon a man and woman who were both lying in the last stage of the very worst form of the disease ; and though they both died eventually, still the evident relief they experienced after taking the medicine, determined him to repeat the experiment. The preparation he used was an infusion, made by digesting an ounce and a half of the leaves on ten ounces of boiling water for half an hour ; and the next person he gave it to was a man who was brought in apparently on the point of death, his extremities being cold and blue, his tongue cold, and no pulse perceptible, &c. He immediately ordered him a warm bath, and then a spoonful of the infusion every hour. Next morning, to his great amazement, he found the patient nearly recovered, and complaining only of weakness; and he was able to dismiss him on the fourth day. Of 28 cases in which he subsequently employed the same remedy, 22 terminated favourably. Warm baths, with, in a few instances, the application of 10 or 12 leeches to the præcordia, and of warm fomentations of camphorated spirits and oil of turpentine to the abdomen, were the only other means employed.—*Rusts Mag.*, 1831.

Effects of Repulsion of Tinea Capitis.—A stout child, three years old, after having been for a considerable time affected with tinea capitis, had it suddenly repelled by the application of some domestic remedy. He then lost his former healthy appearance, and became pale and sickly. Some weeks after, he was attacked with a violent pain in the left hip joint, and lost the power of moving the thigh. A quack who was called in, imagined that there was a dislocation, and endeavoured to reduce it, which, of course, only made matters worse. The parents sent for a physician, who ordered tartar emetic ointment to be rubbed on the head ; as soon as the eruption came out the pain in the hip ceased, and the patient recovered in ten days.

Susceptibility of different Races of Mankind to Cholera.—It has always appeared to us, that there was little rational ground for fearing that the *cholera spasmodica* would be fatal to very great numbers of the inhabitants of Great Britain. Our opinion was founded on the fact, that in the East Indies, the natives of Great Britain suffered but little when compared with equal numbers of the native Hindoos similarly exposed ; and consequently, it appeared probable, that the English would not be more susceptible to its influence in their own climate than they had been in the East. The cholera has made frightful ravages among the Hindoos and the races of mankind confessedly allied to them in many particulars, such as colour and general temperament. Thus, the Persians, Turks, Arabians, Egyptians, southern Russians, and Hungarians, have hitherto been the chief sufferers, while the Celto-Sclavonic nations, such as the northern Russians, Poles, Germans, Danes, Swedes, and British, have enjoyed a comparative immunity. Again, we find this disease

spreading with dreadful rapidity in France, where the southern race preponderates, notwithstanding the original admixture of some northern tribes. If our conjecture be correct, it may be expected that the Spaniards, Portuguese, Italians, and Greeks, will suffer in a similar degree, while many of the provinces of North America, as being colonized from Britain, will escape comparatively free.

Sulphate of Quinine against Tænia—A Tertian fever had been treated in different ways without success, until M. Kunzsch had recourse to sulphate of quinine, given in the dose of two grains every two hours. After the sixth dose, the febrile paroxysm returned unexpectedly, and before the usual time, it was besides accompanied with vomiting and convulsions. The next being the apyrexial day, the patient took six powders containing each three grains of sulphate of quinine, one of these powders was taken every hour. By this treatment the fever ceased; however, M. K. made the patient to continue the use of the sulphate of quinine in doses of two grains four times in the day: soon after the ingestion of the sixth dose, diarrhœa came on, and the patient passed in the course of three days more than 100 yards of tænia with the head of the worm. The symptoms usually manifesting the presence of tænia, had never been observed in this individual, but the tertian fever had certainly been excited by this parasite; for there were no other cases of ague in the district. *Jour. für Chirurg. und Augenheilk.* T. xiv. 660.

Permanent Patency of the Aortic Valves.—Dr. Corrigan has determined the signs diagnostic of this diseased state of the centre of the circulatory system; it occasionally occurs alone, although generally complicated with other organic disease of the cavities or other valves of the heart.

The general symptoms are not well marked, they do not differ from those generally occurring in any of the organic diseases of the heart, but the greatest certainty in the diagnosis of this state, may be arrived at from an examination of the physical and stethoscopic phenomena, which are very peculiar.

These symptoms may be referred to three heads: 1st, visible pulsation of the arteries of the head and superior extremities; 2d, *Bruit de Soufflet* in the ascending aorta, and in the carotids and subclavians; 3d, *Bruit de Soufflet* and *fremissement* in the carotids and subclavians. In conjunction with these may be reckoned the pulse, which is always full. When a patient affected by this disease is stripped, the arterial trunks of the head, neck, and superior extremities, immediately catch the eye by their singular pulsation. At each diastole the subclavian carotid, temporal, brachial, and in some cases even the palmar arteries, are suddenly thrown from their bed, bounding up under the skin. The pulsations of these arteries may be observed in a healthy person, through a considerable portion of their tract, and become still more marked after exercise or exertion; but in the disease under consideration, the degree to which the

vessels are thrown out, is excessive. Though a moment before unmarked, they are, at each pulsation, thrown out on the surface in the strongest relief. From its singular and striking appearance, the name of *visible pulsation* is given to this beating of the arteries.

Dr. C. enters at length into an examination of the way in which these physical phenomena are produced by the imperfect closure of the aorta, and consequent regurgitation of blood into the ventricle at each diastole, for which very interesting portion of the Paper, we must refer to the original.

Four distinct states of disease may render the aortic valves incapable of performing their normal office, viz. 1st, where from gradual absorption of the substance of the valve, it becomes perforated with holes, and therefore unable to close the tube of the aorta. 2d, Where one or more of the valves are ruptured, and when pressed flap back into the ventricle, leaving a portion of the tube open. 3d, Where by osseous deposition or otherwise, one or more of the valves become tightened or curled back on the side of the artery, and therefore no longer take their proper position, on the passage of the blood into the vessel; and 4th, where the valves remaining healthy, the vessel becomes dilated, so that the former are no longer capable of filling up the area of the latter.

The supervention and progress of the disease do not differ much in their general history from that of other diseases of the heart. Where the inadequacy of the valves has lasted for some time, the left ventricle generally becomes hypertrophied, from the necessity of increased power to overcome the obstacle to the circulation. Other lesions of the heart also are not uncommon accompaniments of this disease.

With regard to the treatment, Dr. Corrigan very justly remarks, that as the disease consists in the blood being imperfectly driven through the arterial system, whatsoever would diminish the action of the heart, would aggravate the sufferings of the patient; and as the longer the interval between the contractions of the ventricle, the more blood would regurgitate, those medicines which diminish the frequency of the pulse, would increase the severity of the disease. Hence, low diet and digitalis are both totally excluded. A good diet, and the employment of moderate stimulants, are the best medicines. But in cases where inflammation of any organ comes on, or where under the strengthening system, the patient makes such a quantity of blood as to overload the heart, there a copious bleeding is productive of great benefit, and the patients bear the loss of blood remarkably well. Opiates also are in these circumstances of considerable benefit.—*Edinburgh Medical and Surgical Journal*, April, 1832.

Mode of Action of Sal-ammoniac.—Dr. J. Wilh. Arnold of Heidelberg, is the author of a series of well appointed experiments, made with a view to determine the mode of action of muriate of ammonia on the animal organization. He introduced it into the stomach of rabbits, in small and large quantities, injected it into the

veins of dogs, and by carefully marking its effects on the functions, and the state of the different organs in the dead animal, he has arrived at some conclusions, which are interesting as far as they go.

Effect on the Stomach, and Alimentary Canal.—In moderate doses, it exalts the activity of the secreting organs of the chylopoietic system, particularly the mucous secretions, both by its immediate application, and because it is in this manner that it is separated from the blood. If its use be long continued, the vermicular motion of the gastro-intestinal tube is diminished, as is evinced by its relaxation, and the retention of its contents, which commonly distend the intestines and even the stomach. If large doses be given, either vomiting is produced, or inflammation of the mucous membrane, and sometimes separation of the latter from the muscular tunic, which may be met occasionally also inflamed. Tough mucous, and even bloody secretion from the mucous glands, is observed, and finally by its influence on the nervous system, tetanic convulsions, and death.

Effect upon the Blood.—When sal-ammoniac has been introduced into the stomach, it is soon absorbed and carried into the circulation, and there produces some interesting effect. In animals under the use of sal-ammoniac, the blood was found to be much less coagulable than usual. The process required a longer time for its completion, and the mass of coagulum bore a much larger proportion to the serum than it usually does in a state of health. Thus:

The blood from a healthy boy was composed of			The blood from a boy under the influence of sal-ammoniac.		
Coagulum,	-	46.52	Coagulum,	-	56.65
Serum,	-	53.48	Serum,	-	43.35

Notwithstanding this alteration in the vital properties of the mass of the blood, the relative proportions of its constituents are not changed, the quantities of the red matter, the fibrine, &c. did not deviate from the natural standard. The serum contained a little more saline matter than is usually the case, which Dr. A. referred to the superior solvent power of the solution of sal ammoniac.

Action on the Organs of Secretion.—Its most determined action is on the mucous surfaces, the secretion of which becomes thick, and increased in quantity: having proved this by his experiments, Dr. A. alludes to its use in diseases of the mucous surfaces, and mentions that beneficial results had been obtained with it: by Cramer and Blume in catarrh of the bladder, by Buchner in gonorrhea, and by himself in a chronic discharge of a large quantity of mucus from the intestines, he considers that its use in diminished as well as in increased menstruation, depends on its effect on the mucous tissues.

It has not any perceptible action on the liver or other glands. It passes into the urine in considerable quantity, but Dr. A. doubts whether it passes by the kidneys, or by the mucous membrane of the bladder.

It diminishes muscular action, hence the accumulation of fæces in the intestines of bile in the gall bladder, &c.

Action of Sal-ammoniac on the Nervous System.—Hitherto, authors have denied that sal-ammoniac, when introduced into the body, had any action on the nervous system; in fact, when given in small doses, no appreciable effects are produced, and the nervous symptoms which follow the ingestion of large doses of this salt were supposed to depend on the blood going to the brain, while altered in its vital properties by the action of this salt. However this may be, it, when given in moderately large doses, produces a most marked action on the nervous system. It brings on tetanus, violent convulsions; the respiration becomes deep, hurried, and interrupted; the action of the heart irregular, and the death of the animal generally is produced by the cession of respiration, and repeated and violent attacks of tètanus.—*Zeitschrift für die Physiologie*, Band. 3rd, 1st Heft., p. 140.

Conversion of Hydatids into Tubercles.—There are at present known two kinds of acephalocystes, the one peculiar to the human race, the other to sheep and oxen. It was hitherto believed, that the first was the only race capable of reproduction, but it results from the researches of M. Kuhn, that the second species is equally so, and that both species germinate by ovulæ, or rather by buds, which are developed in the pellicle of the acephalocyst. What distinguishes totally these two species, is, that the acephalocyst of man produces young individuals, which, detaching themselves, fall into the interior of the parent, whilst in the acephalocystes of the ox, the young ones detach themselves externally, and separate entirely from the body of the parent. On this account, Dr. Kuhn terms the former species *endogenous*, and the latter *exogenous*.

According to the observations of M. Kuhn, the kyst which envelopes the acephalocyst, is always consecutive to the latter, and must be regarded as a mode of reaction of the organization against the parasite, a means which nature uses to circumscribe the animal, to arrest its developement, and determine its destruction. In fact, as soon as the kyst is converted into an organized membrane, it secretes from its inner surface, a yellow soft matter of a tuberculous nature, and containing a considerable quantity of calcareous salts. This matter accumulating gradually, crushes the acephalocyst, the sides of which fold up, and finally the cavity is totally effaced. In place of a vesicular worm, finally the cyst contains merely a tuberculous mass, in the centre of which is found the remains of the acephalocyst. The salts of lime with which the tubercular matter was loaded, are formed into concretions more or less hard, and prevent the tubercle from softening or altering. This period once attained, the organization ceases to react, and accommodate itself easily to these tuberculous nuclei, if they be not too large or too numerous.

The tubercles produced by acephalocystes, may be distinguished from all the other kinds, by their being always encysted, and the original membrance of the worm being generally found irregularly folded and enveloped by tubercular matter and calcareous concretions.

These kinds of tubercles have nothing in common with those of phthisis; extremely rare in man, they are often met with in oxen and in sheep.—*Bulletin des Science Medicale*, August, 1831.

SURGERY.

Case of Ligature of the Penis.—The following is a curious case, and might be interesting as a medico-legal fact. A Jew-boy four weeks old, was suckled by a nurse whom the family became dissatisfied with, and dismissed. Two days afterwards Dr. G. was sent for on account of painful swelling of the boy's penis. On accurate examination, he found a long hair of the head five times wound round the root of the penis, precisely in the same furrow, and each time tied firmly with a knot. With great difficulty the hair was discovered and removed, from the deep incision it had made; after which, emollient applications speedily healed it, but had it remained a short time longer, gangrene would inevitably have occurred. "Very probably," says Dr. G. "the nurse wished in this manner to revenge herself for her dismissal."—*Rusts Mag.*, 1831.

Inversio Uteri.—A woman aged 32, who had borne four children, and had a remarkably easy time with each, was delivered of her fifth child after a very short labour. Immediately after the infant came, the uterus inverted, and with the placenta attached to it. The midwife endeavoured to return it to its place, but the woman died suddenly in convulsions. The midwife declared to the physician who was called in, that she had not pulled the navel-string, or done any thing else that could have caused the accident, and her statement was supported by the testimony of some of the neighbours of the patient, who had been present the whole time. It is probable, therefore, that the inversion was owing to the width of the pelvis, which was remarkably great, and the rapidity of the labour.—*Rusts Mag.*, 1831.

Foreign Substances in the Body.—A man accidentally broke a bottle in pieces in his hands; he picked out all the fragments, as he thought, and the wounds soon healed. Still, when working, he constantly felt pains in the one hand, and sometimes it used to swell greatly. In twelve years and a half after the accident, he had occasion to make a great exertion with the same hand, whereupon he felt a violent pain in it, which lasted for some weeks. An opening then appeared on the palm, and a surgeon on probing, found some foreign substance at the depth of about half an inch from the surface. He enlarged the opening, and extracted a splinter of glass one-third of an inch long,

and a line in thickness, together with three smaller pieces, which had probably been broken off from the larger one.

A man felt a stinging pain in the upper part of the right arm; a surgeon put a plaster on the spot, and for years after he felt neither pain nor swelling. On a sudden, he felt the same kind of stinging at the opposite side of the arm, and a needle nearly three inches long was extracted from it. He could not account for how the needle got into his arm at all.

A woman got a blow upon her breast, and thought she felt a pin stick in her. Seven years afterwards, as she was washing herself, she observed a pin protruding from the skin of the part, and succeeded in extracting it.—*Rusts Mag.*, 1831.

Use of Potassium as a Caustic.—The property of potassium to burn on coming into contact with water, induced M. Græfe to try its employment as a caustic. To apply it, a piece of card is perforated by a hole of the size of the ulcer, which it is wished to produce; the card is moistened, and adapted to the place to be cauterized. To preserve the neighbouring parts, they are covered with a piece of moistened linen. A small bit of potassium is to be then placed in the perforation of the card, and some drops of water let fall on the metal; when the combustion is completed, the burned place is to be dressed with lint and simple cerate. The combustion is performed with the rapidity of lightning, and the pain lasts only during the oxydation of the potassium.

The indications for the use of this metal as a caustic, are the same as those for the use of incandescent iron. In the clinical institution for surgery and diseases of the eye at Berlin, potassium has been employed against chronic diseases of the joints. M. Dümmell has used it to arrest hemorrhage from leech-bites. It would certainly be of use in cauterizing bites of venemous animals, and against telangiectasial developments (accidental erectile tissues—Ed.) and as a very powerful stimulus in cases of insensibility. It has a very great advantage over incandescent iron, that of not alarming the patients, and of not causing such long continued pain. The eschar produced, also detaches itself much more rapidly and more easily.—*Jour. für Chirurg. und Augenheilkunde*, xiv. 627.

Tumour expanding the spinal Chord and Nerves, without impairing the sensation or motion of the lower Extremities, by Mr. Logan.—I was requested by a brother practitioner to see a newly born infant which had a malformation of the back. On examination it proved to be a *spina bifida* of the most extensive description. When first observed, the tumour had, I was informed, a very vascular appearance in the centre; on the edge it was raised up, containing a clear, watery fluid, enveloped by a very fine pellucid membrane; the vascular appearance in the centre soon after birth became of a dark purple hue, which remained two days. The surface of the tumour then assumed a sloughy appearance with evident loss of vitality;

but the borders were still transparent, through which, at the lower part, the nerves could be distinctly seen passing down in separate bundles towards the outside of the sacrum. Spontaneous rupture took place, and death followed in a few hours on the 4th day.

Leave being granted to examine the body, a crucial incision was made through the membranes enveloping the tumour, and the flaps dissected back. The whole posterior part of the vertebral canal, from the second dorsal *vertebra* downwards, was wanting. The surface being cleaned, the centre presented an oval mass of a striated fibrous texture, and of a dark purple colour. It was a substitute for the spinal chord, imbedded in cellular substance, which seemed to have taken on a high degree of inflammatory action, every part of it being ramified with enlarged capillary vessels, from which a quantity of florid blood was squeezed by the handle of the scalpel.

Nature had already begun a process for securing and strengthening this most essential part by the deposition of a thick layer of coagulable lymph round its edges, not yet organized. The spinal column maintained its integrity as far down as the second dorsal *vertebra;* it then degenerated into the mass of nervous substance above described. The osseous fossa, within which this collection of nerves reposed, was from an inch to two inches in width, and lined with a strong tunic, which sent a septum firmly attaching it to the bottom of the hollow throughout its whole length. This tunic was pierced with holes corresponding with others in the bony canal at the junction of each vertebra for the exit of vessels, and for the admission of the intercostal and lumbar nerves. Immediately outside of this tunic, on each side of the spine, there was formed a series of ganglions of a perfectly spherical shape, and about half the size of a garden pea, into which two nervous bundles were seen to pass, separated from each other by the space of a line, and lying in the same plane. It is evident that these must have been the nerves of sensation and of volition of C. Bell; but, from the irregularity of their origin, it was impossible to trace them. At the promontory of the sacrum the nervous bundles were united in a more regular manner, which again underwent subdivision, and were distributed into the holes of the sacrum. The aorta and *venæ cavæ* were in their usual situation; the kidneys and other viscera of the abdomen were in a natural state. I regret that want of time prevented any examination of the head; but it was well formed, presenting no hydrocephalic symptoms, and the child seemed otherwise in a healthy condition. From such an extensive malformation, paralysis of the lower extremities might have been expected; but it passed its urine and fæces naturally, and when slight pressure was exerted on the tumour, it moved its limbs with tolerable activity.—*Edinburgh Journal, April.*

Ossification of the Umbilical Chord, by Mr. Logan.—In a case which lately came under my observation, I had occasion to remark a preternatural fragility of the *funis*, which, as far as I can recollect, has not been noticed by any obstetric writer. It

occurred in a woman of a weak leucophlegmatic temperament. The *funis* was remarkably short and thick. In tying it previous to the separation of the infant, I was under the necessity of using great precaution, as the smallest degree of undue pressure caused a rupture of the vessels, giving origin to hemorrhage from the infant; indeed, I was obliged to shift the ligature more than once; and in pulling at the chord, in order to assist the expulsion of the placenta from the vagina, it gave way several times. On examination, it appeared of a cartilaginous structure. Query, Might not this state of the parts give rise to serious hemorrhage and death of the child, from any undue pressure during labour?

Tumour of the Pharynx removed by Ligature, by Mr. Logan.—A child, æt. three weeks, had since birth been affected with a difficulty of respiration, which produced a croaking noise something similar to that in croup. The infant kept its mouth constantly open, with the tongue retracted, and the point elevated towards the palate. Its colour, when the fits of dyspnœa were most violent, was of a purple hue, and it could not suck without great risk of suffocation. Indeed, from its inability to obtain its natural food, it had undergone a considerable degree of emaciation. On 16th August its mother brought the child to me, and said that she had observed it vomit something red, which filled its mouth, but that it had been immediately swallowed. I was inclined to laugh at the story, especially after examining the child's mouth, when nothing extraordinary was to be seen. By way of experiment, however, I tickled the fauces, so as to induce the action of vomiting, when it brought up, to my great surprise, a tumour three inches in length, and one and a-half inches in circumference. Whenever my finger was removed from the it was again swallowed, and the croaking noise recommenced, followed by a considerable discharge of frothy mucus. It was with difficulty that a part of the base of the tumour could be seen, even by depressing the tongue, on account of its deep attachment in the fauces. In its natural situation it occupied the centre of the upper part of the pharynx, having the uvula in front. Its base was of a considerable breadth, as far as could be judged. On the following day, having induced the child to vomit up the tumour, the apex was secured and retained by a *tenaculum;* a single loop of dentists' silk was then passed through a double *canula,* and drawn pretty firmly, after which another was passed to complete the knot; the ends were then cut away, and the tumour swallowed. Next day the tumour was again brought up; but, from the maceration in the mouth, and perhaps the inaccuracy of the application of the ligature, it had slipped. Another single noose was therefore passed over the tumour, tightened by the *canula,* and fastened to one of its eyes. The *canula* was then retained in the mouth till the circulation was impeded, the ligature being from time to time tightened. The tumour was then cut away by the scissors close to the ligature, and the *canula* removed. The child breathed quite freely during the whole

time the tumour was in the mouth, and was fed with its mother's milk, which it greedily swallowed from a spoon.

I was obliged to adopt the awkward mode of operating by the *canula*, as I did not think it safe to excise so large a tumour in an infant of such a tender age, and where the difficulty of any remedial application must have been insurmountable; because I concluded that the vessels which fed the tumour must have been of such a size as (when assisted by the warmth and moisture of the mouth) to warrant apprehension of danger. Nor do I conceive that torsion could have here been applied with safety, on account of its broad attachment, as it might have brought away a large portion of the mucous membrane lining the fauces, and done irreparable damage. The base of the tumour now presents a small button-like projection, which does not in the least interfere with the function of the epiglottis. The child is now quite well, and has gained flesh considerably.

The preparation of the tumour I presented to the Royal College of Surgeons of Edinburgh.—*Ibid.*

MATERIA MEDICA AND PHARMACY.

Varieties, Cultivation, and Collection of Cinchona.—During a residence of many years in the provinces of Peru, M. Alexandre Cochet collected a number of observations on the plants of these countries; the facts communicated by him concerning the cinchonas serve to render much more exact our knowledge of this important and interesting family.

The provinces of Appolobamba and of Caopolican in Peru furnish most of the finest barks termed Cinchona Callisaya. The principal valley is that of Appolobamba; the kind of Cinchona obtained in the valley of Tiperani is of the second quality; that from Carrewilla is very bad, and has seriously injured those who speculated in it.

In these valleys the temperature is mild, it never freezes.

The trees which yield the barks grow very well on elevated situations, best on the sides of ravines, and where they are shaded from the sun by surrounding trees. In fact it is remarked that in those parts of the forests to which the direct light of the sun has access, the bark becomes very thin, and strongly adherent to the tree at the side where it receives most light.

In open plains the cinchonas remain small, their bark thin and inert.

The best varieties of cinchona are those which possess the following characters.

The leaves of the tree are of a wine-red colour from the middle to the point, lanceolate; while the leaves of the tree yielding the second

quality are small and green. The leaves of the tree yielding the worst quality are rounded, green, very large, and with sinuous borders. The wood of this last is reddish, whilst that of the two former is yellowish white. The fresh barks of the good variety are white internally; the other one more or less reddish yellow. Externally the bark of the good variety is rough, cracked in rectangular sections, and covered with an opaque whitish crust.

The trees, the barks of which are fit for removal, must be very old; the natives do not know their age; they showed M. C. trees, aged 20 years, which had only the height of shrubs.

When they go to look for cinchonas the Indians ascend a high tree and observe those points in the forest where they see masses of white flowers; at that time the cinchona is the only tree in blossom. The collection of the bark is made in the intervals of the rain from October to April, the sap being then flowing, the bark detaches itself more easily.

The trees are cut down with hatchets, the natives then trace on the trunk ribands of bark of the size generally sent into commerce; they cut with a knife these stripes longitudinally, and then beat them with a stick, or the back of a knife, until they soften the connexion with the wood, so as to allow of the removal of the bark.

The pieces of bark are then dried by exposure to the sun, and are protected from the wet in sheds if any rain should come on; when they are similarly dried they are made up in bundles of from 25 to 40 pounds, and are carried by the natives until they reach the places accessible to mules, (a journey of from six to eight days,) all the trees in the neighbourhood having been long since used. The desiccation is then completed, and the bark made into packages of about 35 pounds, and carried to the coast on the mules.

In the ports of the Bolivian and Columbian Republics, as Islay, Arica, or Cobya, the cinchona is packed in bales, containing each six arobes, (about 150 pounds,) and exported to Europe.

The barked wood is left in the forests: the bark of the branches is not collected, although it would probably contain a considerable quantity of active matter.

The bark of the root is more bitter and thinner than that of the trunk. The Indians prefer it for curing fevers, as they say it acts more promptly. It would be very desirable if it would be ascertained by analysis, whether this opinion of the natives be founded on fact, and if the bark of the root contain a larger proportion of active ingredients, as if so, it, as well as that of the wood, might equally be introduced into commerce.—*Journal de Chimie Medicale*, Fevrier, 1832, p. 75.

Preparation of Muriate of Morphia, by Dr. Robertson.—Until the introduction of the muriate into medicine, the salts of morphia were prepared on a plan divisible into four stages; which had for their ostensible objects, the separation of the active from the inert principles,—the isolation of the morphia,—its decolorization,—and

its recombination with acids. The first was accomplished by dissolving the salts contained in opium; the next by decomposing them with an alkali; the third by treating the precipitate with charcoal and alcohol; and the last by dissolving the product in an acid. Latterly, comparative purity had been obtained by decolorizing a salt of morphia, which was afterwards decomposed to procure the alkaloid for recombination. The first step has been effected at different periods by means of water, hot or cold, acidulated or plain; or lastly, by fermentation. In whatevor way it is made, the infusion contains a free acid, more or less resinous colouring matter, solutions of morphia, and of narcotine. The three last, intimately blended, are thrown down on the addition of ammonia; animal charcoal, and repeated crystallizations in alcohol, remove the colouring resin; but the narcotine passes untouched through all these ordeals, and from its similarity to morphia, has been generally mistaken for it. This impure product being dissolved in the acetic or sulphuric acids, the liquid is evaporated to dryness; and thus the narcotine remains mixed with the resulting salt, either in a crystalline form, (if, as Robiquet asserts, it be crystallizable,) or in the shape of a transparent coating, enveloping its particles.

Some chemists, indeed, as Merk and Wittstock, have, by ingenious and expensive processes, obtained morphia perfectly pure. But I speak of the alkaloid as it is generally manufactured; when the object of the pharmaceutist being merely to procure a saleable article, purity is little valued, and not particularly sought after, when it is obtained at the expence of considerable diminution in quantity.

It is easy to observe that the complication of treatment which these processes require; the combinations, decompositions, solutions, and crystallizations which they enjoin; the evaporations and filtrations which they direct; cannot be completed without considerable expense of time, labour, and material. By the introducing into medicine the muriate of morphia, and publishing a mode of preparing it, Dr. Gregory rendered the latter part of these processes useless, and abridged much that was tedious and objectionable. I have now to propose an improved method; which, by curtailing still farther the necessary operations, will render the preparation of the muriate, much more easy and economical.

This process has for its prominent feature the employment of *double* decomposition; a plan which secures at one step the separation of the meconic acid,—and the union of the morphia with muriatic acid. The liquid employed to effect this decomposition is the muriate of lime; an article whose cheapness renders economy in its use no object. Perhaps in other places, muriates may be found more suitable, for other reasons; but this one seems to me best calculated to enable us to procure, on the one hand the meconic acid free from colour, on the other the muriate of morphia free from narcotine.

The first step of the process resembles that of all others, in as far as the solution of the active principles is concerned. The opium, cut in pieces, is macerated in water at a temperature not exceeding 100

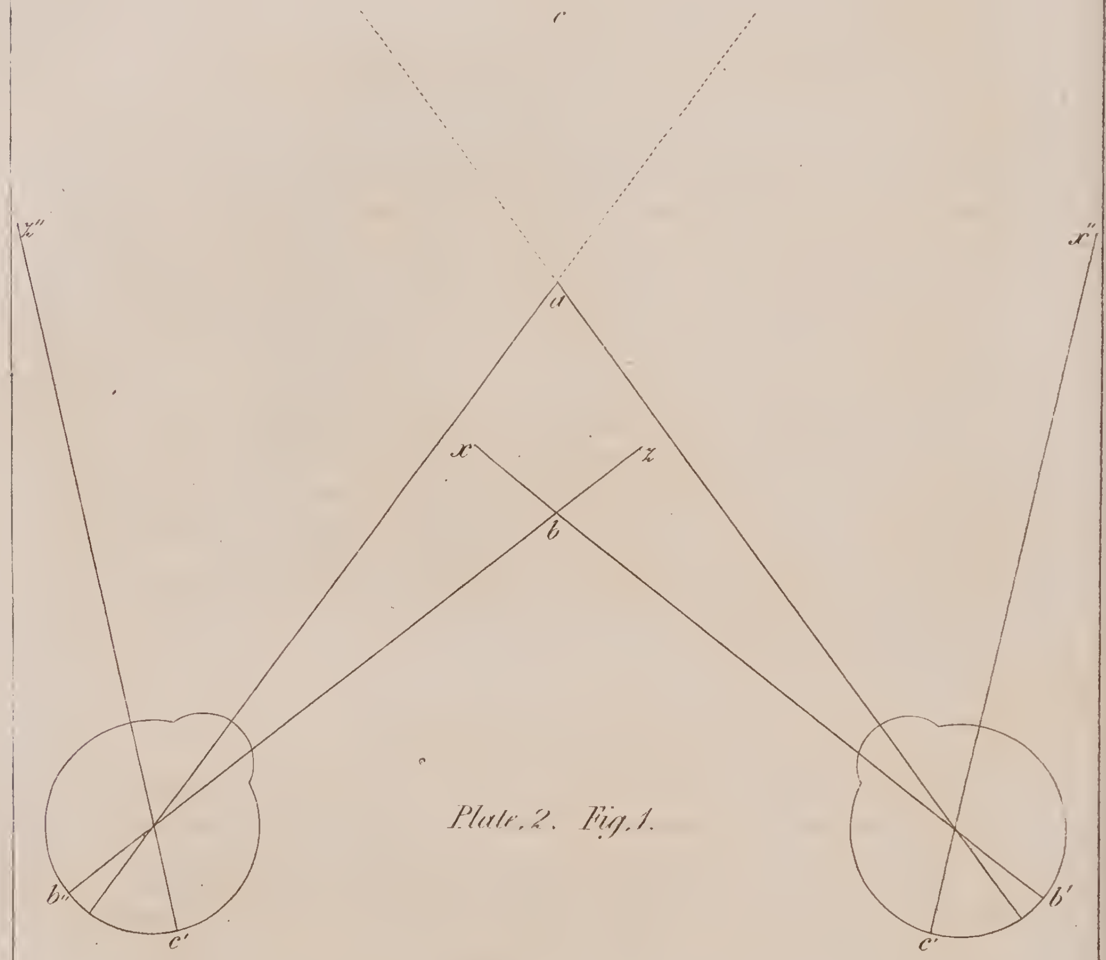
F.; as it softens it is worked up into a pulp, and frequently stirred during the course of exhaustion; the infusion, as it becomes saturated, is drawn off clear, and may be immediately subjected to evaporation.

This evaporation is conducted in a large vessel of tinned iron; and a sufficient quantity of marble, in coarse powder, is added to saturate the free acid. The muriate of lime used should contain no iron, lest, in combination with meconic acid, it give a deep colour to the liquid, difficult to be got rid of; and the quantity required for each portion of infusion, is best learned by experience. When the infusion has reached the consistence of syrup, an excess of muriate of lime is poured in, and the boiling is continued for a few minutes longer. Then the whole may be emptied into a large basin, and when cold, diluted with water, until a copious separation of resinous flocks takes place. In this way most of the meconate of lime, which is nearly insoluble, and a great quantity of colouring matter, are got rid of;—the separation of the latter being the more copious and complete, the more concentrated the liquid is before dilution, and the nearer that dilution approaches a certain point; after which, further dilution causes the flocculi to be partially redissolved, and to render the filtered liquid turbid.

When these flocculi have subsided, the clear part is evaporated as far as possible, on a sand-bath; a small bit of marble being put into each dish to neutralize any free acid, and the fluid being poured off the sediment before it is permitted to crystallize. We may, at this stage, prove whether enough of muriate of lime has been added, by trying if a little of the clear liquid will, aided by heat, separate meconate of lime from an equal bulk of concentrated infusion. When about to consolidate, it is stirred into a uniform mass, from which, enclosed when cold in a stout cloth, the dark fluid is expressed as completely as possible. The cake of impure muriate is dissolved in water at 70° F., and the solution filtered through cloth, whereby a large quantity of impurities will be separated without loss; the liquid, to which a small portion of muriate of lime is added, is now re-evaporated, neutralized, and treated in other respects as before. In the next evaporation the liquid, now completely free from meconate of lime, is slightly acidulated; a judicious suggestion due to Dr. Gregory, who has observed that the acid renders the colouring matter more soluble, and thus more completely separated, when the product is expressed for the third time. The muriate, which is now of a light brown colour, is next dissolved in boiling water, carefully neutralized with chalk, and mixed with animal charcoal; which, provided it do not contain a free alkali, requires no purification. Fresh portions of hot water should, from time to time, be added, until there is enough to keep the salt in solution when the liquid cools; and the whole is to be frequently stirred, that the most may be made of every particle of charcoal. The temperature should not permanently exceed 190° F. lest any of the muriate be decomposed. If the charcoal be good, and in sufficient quantity, at the same time that the liquid is

dilute, and frequently agitated, twenty-four hours of contact is sufficient to decolorize it so far, that on the addition of a little acid to the filtered liquid, it becomes almost colourless. This effect produced on the colour by the addition of an acid (and any acid will do) I cannot explain. It was first observed by Dr. Gregory, who has also remarked that muriatic acid, added to a neutral solution of muriate of the specific gravity of 1.020, when cold, and in which there is no appearance of crystallization, causes it in a short time to become a mass of crystals, which, when dried in the air, are perfectly neutral.

The mass that results from the evaporation of the decolorized liquid, is subjected to pressure in portions of about six ounces each, tied up in well-washed cotton cloth; the superfluous ends of which are cut off, in order to prevent them from making the surface of the cake irregular. They are next put into a stove heated to about 100° F. where they remain until almost dry, when the cloth is removed and the coloured surface scraped off. After being pounded and dried *till no more weight is lost* at a temperature of about 150° F. the muriate resembles chalk in colour and appearance, is permanent in the air, and is fit for medical use. If a little be now dissolved in distilled water, and pure potash added, crystals of morphia are presently separated, which are completely redissolved on the addition of an excess of the alkali, the absence of the characteristic milkiness, changed by heat to woolly flocks, indicating a total freedom from narcotine. A very few coloured flocculi may remain, so inconsiderable in weigh as to be of no moment, and totally removed by filtration; as is any remaining yellow tinge by a fresh crystallization, if the liquid be previously well acidulated.



Plate, 2. Fig. 1.

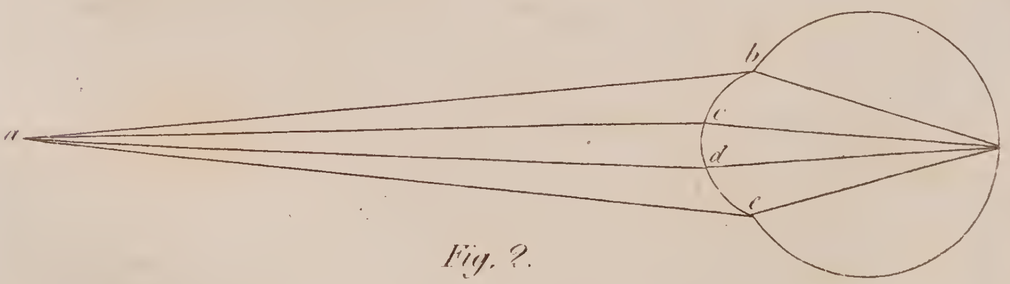


Fig. 2.

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PART I.

ORIGINAL COMMUNICATIONS.

Art. XVI.—*On Double and Single Vision.* By Robert J. Graves, M. D., M. R. I. A., King's Professor of the Institutes of Medicine.

Buffon, Doctor Gall, and many other authors, have noticed the common observation, that under certain circumstances an object appears double when viewed with both eyes; these circumstances are detailed with precision by Dr. Arnott, in the following passage of his work on the Elements of Physics.*

"When the two eyes are directed to any object, their axes meet at it, and the centres of the two retinæ are opposite to it, and all the other points of the eyes have perfect mutual correspondence as regards that object, giving the sensation of single vision; but the images formed at the same time, of an object nearer to or farther from the eye than the first supposed, cannot fall on corresponding points, for an object nearer than

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* Vol. ii. p. 217.

where the axes meet, would have its images on the outsides of the eyes, and an object more distant would have its images on the insides of the eyes, and in either case the vision would be double. Thus, if a person hold the two forefingers in a line from his eyes, so that one may be more distant than the other, by then looking at the nearest, the more distant will appear double, and by looking at the more distant, the nearer will appear double."

In making this experiment it is singular that no one has noticed the very remarkable difference which exists between the relative position of the images in the two cases here spoken of. Thus, when the object is nearer than where the axes meet, the image on the left hand is that seen by the right eye, and that on the right hand belongs to the left eye; whereas, when the object is more distant than where the axes meet, the left hand image is seen by the left eye, and the right hand image by the right. The annexed diagram will enable the student to understand this experiment and its explanation. (*See Plate* 2, *Fig.* 1.)

Let both eyes be directed to the object a, at which therefore their axes may be supposed to meet, (if produced,) then a nearer object, b, also visible to both eyes, will have its picture on the retina of each at some point to the other side of the axis from itself; but as b is inside each axis, its picture will consequently be outside each, say at b', b''. Now, as every object is seen in a direction perpendicular to the point of the retina on which its picture falls, the object b will be seen in the direction $b'\,x$ for the right eye, and $b''\,z$ for the left; and consequently as these directions cross each other, the image seen by the right eye is to the left of that seen by the left eye.

If the object c be beyond the point to which both eyes are directed, then it is plain that being outside both axes, its images will be inside them, as at c' c'', and they will appear in directions $c'\,x''$ and $c'\,z''$, which do not cross each other; therefore in this case the image seen by the right eye is to the right of that seen by the left eye.

We have here supposed the objects placed between the

axes before or after their intersection; if, however, they be in any other place, the same rule still applies, as may be demonstrated both theoretically and experimentally. These experiments are strongly corroborative of the accuracy of those who maintain *that every object is seen in a direction perpendicular to the point of the retina on which its picture falls,* for otherwise the results of the experiments just spoken of, could not be always accurately predicted; the student will at once perceive the importance of this law, and the beauty of its operation, when he considers that each visible object, as *a,* (*Plate* 2, *Fig.* 2,) (here represented as a point,) is painted on the retina by means of a number of rays which the refracting powers of the eye cause to converge to form its picture *a*. Now, if every ray, *b a, c a, d a, e a,* converging to *a,* were to produce a sensation in its own direction, the object would be seen in as many different directions as there are converging rays, (for each of these arrives at the retina in a different direction,) and thus not only would the true direction of the object be mistaken, but each of its images would be very indistinct, being produced by only a single ray.

In consequence of the law of visible direction, however, these inconveniences are obviated, and all the converging rays are made to unite in producing the desired effect. It may be remarked, that the sense of touch presents us with something analogous, for no matter what has been the direction of a moving point, when it arrives at the skin, it excites a sensation unconnected with that direction, and apparently perpendicular to the skin at the point of contact.

This law of visible direction is fully explained, and its importance pointed out, in the Library of Useful Knowledge,* and Dr. Brewster, in his admirable Treatise on Optics, published in Dr. Lardner's Cabinet Cyclopædia,† has established the same law of visible direction, and by its means has fully succeeded in explaining the cause of single vision with two

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* Page 42, Article, *Optics.* † Page 292.

eyes,* as well as the cause of erect vision from an inverted image.† The real cause of erect vision has been also recognized by other writers, as Dr. Mayo in his Outlines of Human Physiology. It is therefore to be regretted that neither this important law, or the conclusions to which it leads, have been even noticed by Professor Lloyd in his able Treatise on Light and Vision,‡ a book deservedly in high repute in our University, and much read by the students. Mr. Lloyd indeed offers no explanation whatsoever of erect vision, and has adopted that of the justly celebrated Mr. Herschel on the subject of single vision, viz. that it is entirely the result of habit.

Mr. Herschel thus expresses himself:§ "As we have two eyes, and a separate image of every external object is formed on each, it may be asked why we do not see double; and to some the question has appeared to present much difficulty. To us it appears, that we might with equal reason ask, why, having two hands and five fingers on each, all endowed with equal sensibility of touch, and equal aptitude to discern objects by that sense, we do not feel decuple?"

With all the deference due to so high an authority as Mr. Herschel, I do not think that the inference he draws from facts connected with the sense of touch, can with justice be extended to the sense of sight. Indeed there are points of difference between the two cases so material, as almost entirely to destroy the force of the analogy. Thus, when we look at a single object with both eyes, we at once perceive it to be single; the perception of its being so is in every case decided and certain, and

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* l. c., p. 300. † l. c., p. 294.

‡ The following is the only sentence in Mr. Lloyd's Chapter on Vision, which conveys the least intimation of such a law: "From all this it manifestly follows, that the only thing necessary to enable us to judge of the position of external objects by sight, is, that there should be a steady correspondence between their positions and the impressions which the rays proceeding from them produce on the retina."

§ Encyclopædia Metropolitana, Part 19.

so far as our sight is concerned, no further experiment is required to convince us, that this our first judgment is correct. But with regard to the sensation imparted to us by two fingers, or ten fingers, it is altogether different. Here no positive knowledge is conveyed to the mind concerning the matter touched, as to whether it is in one mass or in several, whether it is a single object or many, two objects or ten.

Nor can experience here, as it is said to do in the case of vision, instantly correct a sensation in itself erroneous, and derive from it an accurate perception; nor can we by its intervention at once decide whether we are feeling one, two, or ten bodies, in the same way that, by the aid of experience, (according to Mr. Herschel,) we instantly correct the perception derived from our two eyes concerning a single body. Let any one, for instance, apply the tops of all his fingers simultaneously to ten small pieces of ice, and undoubtedly he will receive ten distinct impressions, one from each finger. It is exactly the same when we apply our fingers to one large piece of ice, and consequently here we actually feel decuple. But as our previous experience has warned us against the errors consequent on conclusions drawn from such data; we immediately commence a further investigation of the matter, and institute several successive examinations with our fingers, we feel the intervals between the parts first touched, ascertain whether they are separate or continuous, and thus, finally, by the aid of the sense of touch alone, arrive at an accurate conclusion. Again, if we touch ten pieces of metal of very different temperatures, each is distinctly felt at the same moment, and if it were possible to heat a piece of metal in narrow zones to different temperatures, the feeling being exactly similar, would induce us to think that we were feeling ten pieces, not one, we would feel decuple. It is thus we always judge: when the surfaces felt by our different fingers produce sensations in every respect similar, we infer that they proceed from one and the same body, but when they are dissimilar, we guess that they are caused by different bodies,

and beyond this, our experience is no service as a guide. To be accurate, we must in every case institute a further examination, and there the case differs materially from the perception of a single object imparted to us by our two eyes, a perception correct in the first instance, and requiring not the aid of further experiment. There is likewise another point connected with Mr. Herschel's argument to which I cannot assent; he says, "the case is exactly the same with the sense of touch; lay hands on a globe and handle it; it is *one*; nothing can be more irresistible than this conviction. Place it between the first and second fingers of the right hand in their natural position; the right side of the first, and left of the second finger feel opposite convexities; but as habit has always taught us that two convexities so felt belong to one and the same spherical surface, we never hesitate or question the identity of the globe or the unity of the sensation. Now, cross the two fingers, bringing the second over the first, and place the globe on the table in the fork between them, so as to feel the left side of the globe with the right side of the second finger, and the right with the left of the first. In this state of things the impression is equally irrisistible that we have two globes in contact with the fingers, especially if the eyes be shut, and the fingers placed on it by another person. A pea is a very proper object for this experiment."

To prove that the sensation produced by the pea placed as above described, in the fork of the crossed fingers, has nothing to do with its convexities, as Mr. Herschel supposes, it is only necessary to make the experiment with a flat body instead of a pea. Thus, if a rectangular piece of card in breadth equalling the diameter of a pea, be used, its two corners will give an impression of two separate bodies not less distinct than that derived from the pea. In both cases, the experiment admits of a very easy explanation quite unconnected with the shape of the body; the inside surface of each finger so constantly touches bodies at the same moment in contact with the outside of its

neighbour, that impressions derived simultaneously from both these surfaces, are habitually considered as proceeding from one and the same body. In this case experience has taught us to look upon the double sensation excited by the double point of contact as the sign of the presence of but one body; but when the fingers are crossed, two surfaces, not thus habitually associated in feeling a single object together, are now brought into contact with it, and consequently the first impression, that there is a separate object for each point of contact, predominates, and we seem to feel two bodies, not one.

In support of the influence of habit in producing single vision with two eyes, Mr. Herschel observes, "those who have one eye distorted by a blow, see double, until habit has taught them anew to see single, though the distortion of the optic axes still exists."

The case to which Mr. Herschel here probably alludes, is quoted by Buffon, from the works of Cheselden; and other similar cases have been recorded, but admit, in my opinion, of a very different explanation.

Although the assertion of some physiologists, that we always look with one eye alone,* cannot be admitted, yet it is true that

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* Gall and Spurzheim, Physiognomical System, p. 299, observe on this subject, " There is no doubt that we look with one eye alone; if we place a small stick, a pencil, a goose quill, or another thin body between our eyes and the light, if we keep both eyes open, and point out the right line between our eyes, the stick and light, then if we looked with both eyes the stick should occupy the diagonal, and its shadow should fall upon the nose. But the shadow falls always upon one eye, upon that of which the person who repeats the experiment ordinarily makes use of in looking with attention."

There is certainly a most happy confusion of ideas and absurdity of expression in this passage; he must have accurate notions of the properties of a right line, who, placing a stick and candle before his face, expects to find, and be able to point out, *a right line between our eyes, the stick and light!!* as to what *diagonal the stick ought to occupy if we look with both eyes*, I must confess myself totally in the dark. The experiment in question is extremely simple, although it does not afford a shadow of evidence in favour of the conclusion drawn from it by Messrs.

we all do so occasionally, and under the influence of certain circumstances, this habit may even become permanent.

Thus experienced sportsmen attend only to the right eye in taking aim, although the left remains open, and persons who acquire a squint suddenly, soon learn to attend only to the impressions they receive from the sound eye; at first, that is as long as they attend to, or see the images suggested to the mind by the contorted as well as the sound eye, they see double, because they are unable to direct both eyes to the same object; this error they find cannot be corrected except by attending solely to what they see with one eye, and they invariably prefer using that whose motions are unimpaired; hence, persons with a bad squint, such as the man alluded to by Mr. Herschel, are enabled to see single by force of habit, but it is to be observed, that in producing this effect, habit does not operate in the way Mr. Herschel supposes, for single vision is gradually acquired in such cases, not by new points of both retinas becoming associated together, or rendered *corresponding*, as it is termed, but by so complete a cessation of all association and correspondence between both retinas, that the mind receives impressions from the one but none from the other. Indeed (it seems to me) the phrase, corresponding points of the retinas, ought to be abandoned altogether, for it seems probable that no such points exist; a picture of a given object on one retina can never produce an image coincident with that produced by its fellow picture on the other, unless both pictures happen to fall at the extremities of the optic axes; therefore no other points of the retinas are corresponding; no others can ever become by habit, or any other means, so associated, that similar impressions made on both together are perceived by the mind

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Gall and Spurzheim. In fact, it proves nothing more than the practicability of placing a small object between one eye and a distant candle, in such a manner as to intercept its light and prevent its being seen by that eye. To place the object so as to be between both eyes and the candle is impossible. When its shadow falls on the nose, it will not to either eye appear to cover the candle.

as one. Indeed, facts are not wanting to prove that single vision with two eyes, so far as we enjoy it, is totally independent of habit. Thus, Cheselden operated on a young man blind from his infancy, and gave him the sight of one eye. At the expiration of a year, a similar operation put him in possession of the sight of the other eye likewise. And what was the consequence? According to Mr. Herschel's theory, double vision ought to have been then produced; but it was not; an apparent increase in the size of objects, probably owing to the increased vividness of the impression, was the only result.

All these considerations induce us to join Drs. Gall, Mayow, and Brewster, in the opinion, that single vision with two eyes has nothing to do with previous experience,* and that in this case the sense of sight owes nothing to that of touch. Indeed, the power we possess of correcting the errors of vision by means of the sense of touch, has been much exaggerated. If we look at one of our fingers through a multiplying glass, it will *appear* to the eye many fingers, not one finger, notwithstanding the thorough conviction we have that it is but one. If we put the finger into water, it will appear to the eye to be bent at the surface of the fluid, *though we feel* that it is not so; and no matter how often such experiments are tried, the contradictions between these two senses will remain as strong as ever. In connexion with this subject, I may observe, that the sense of touch has been said to give more accurate ideas of shape than those derived through the medium of vision. A globe, at a distance, it has been remarked, may appear to the eye flat, or a flat surface properly shaded may appear globular; and thus vision may induce us to form erroneous conclusions, which the sense of

* Dr. Gall observes very judiciously, "Moreover, nobody recollects to have seen objects double in his infancy; no person born blind who has recovered his sight by the operation for the cataract has seen objects double. We have also never observed or heard that animals take single objects for double ones. Animals which live a short time, and which never can rectify their vision by touch, are not deceived by the number of objects."

touch afterwards corrects. This mode of considering the subject is evidently incorrect; for in the first place, we cannot by the touch alone decide as to the globular or flat shape of the surface in question until we have felt it all over, until we have applied our finger to it on every side; now, if we take similar pains with regard to the evidence derived from vision, if we approach the surface, and regard it in various positions, in fact, if we look at it not merely in front, but in profile, we shall be at no loss to distinguish what is flat from what is globular.

But to return to our subject. From what has been stated, it appears that no object is seen single except both eyes be directed to it, in other words, except it be placed at the intersection of the optic axes. When an object is so placed, it seems to the right eye to be exactly in the same place as to the left eye, and consequently, its two images perfectly coincide, and appear but one. If the object be moved out of this position, its two images no longer overlap each other; and if it be very small and bright, it will very soon appear double. From this it follows, that in truth we only enjoy single vision in its perfection with both eyes with respect to one object at a time, and that all the remaining objects within the field of view common to both eyes are seen with their images not perfectly coincident, but more or less overlapping each other, or else completely separate; and consequently, such objects appear, if I may use such an expression, more or less, or completely, double. To most persons this assertion will appear paradoxical; they will consider it impossible that so curious a circumstance should have escaped their notice; nay, they will at first disbelieve it altogether, as contradictory to their previous experience; but, nevertheless, the fact is so, and we only fail to perceive it because *no object but the one is ever seen distinctly by the eyes at one time.* Thus, when we look at a printed page, we only see one letter distinctly; the letters on each side of it are seen, but much less distinctly, and those at a considerable distance excite no accurate perception of their shapes whatsoever. The

amazing rapidity with which the motions of the eyes are performed, it is true, prevents us from feeling any practical inconvenience from this indistinctness of objects seen obliquely, and the attention we always for the moment bestow upon the object directly before our eyes, prevents us from perceiving the comparative indistinctness of all other objects within the field of view. It is obvious, also, that objects near the intersection of the axes are not seen double, for their images, although not coincident, still very nearly overlap each other. To be seen truly double, therefore, an object must be removed to a certain distance from this intersection, and in proportion to this distance, it is less and less attended to; and consequently, the circumstance of its appearing double is entirely overlooked, unless our attention be forcibly drawn to the fact.

Art. XVII.—*Remarks on some Properties of the Hydracids.* By Robert J. Kane, M. R. I. A., Professor of Chemistry to Apothecaries' Hall, &c.

The terms acid and base are applied to two great classes of chemical substances, which, endowed each with powerfully active properties, have a great tendency to combine, and by their combination, to give rise to the formation of the various salts. These salts are seldom very energetic in their action upon other substances; the violent affinities of the acids and bases appear to be destroyed by their combination; they, as it is termed, neutralize each other; and the fact of the annihilation of the several powers of the acids and bases by their being put in contact with each other, has been beautifully explained by the discovery that these bodies exist naturally in opposite states of electricity.

The bases are all combinations of a metal with oxygen:*

* The basis of the ammoniacal salts is here supposed to be the combination of ammonia with an atom of water, *i. e.* of 1 ammonia + 1 oxygen + 1 hydrogen, the hydrogen and the ammonia forming the metal ammonium, N + 4 H, and the oxygen the oxide.

thus, oxide of potassium, oxide of lead, oxide of mercury, are bases. The acids cannot be classified so simply; formerly it was supposed that all acids did contain oxygen, whence was derived the name of this simple substance: but the progress of science soon proved that many bodies which did not contain oxygen reacted powerfully as acids, as the prussic acid, the muriatic acid, and the hydriodic acid. At the same time it was discovered that the acids which did not contain oxygen were composed of hydrogen united to a radical, which was capable of uniting also with oxygen, and forming a different acid. Thus, the muriatic acid was composed of hydrogen and chlorine, the chloric acid of chlorine and oxygen, the hydrosulphuric acid of sulphur and hydrogen, and sulphur, by combining with oxygen, also forms acids, &c. Thus, the same substances were capable of combining with oxygen or with hydrogen, in either instance forming acids, from whence these bodies were divided into two classes, the oxacids, in which oxygen, and the hydracids, in which hydrogen was the acidifying principle.

By the union of these acids with the bases, two classes of salt are formed; the first, composed of an oxacid united to a base, the second, composed of a hydracid united to a base; of the first, sulphate of potassa, of the second, muriate of potassa, may serve as an example. It was soon, however, found that the salts of the hydracids presented some anomalous properties; first, it was discovered that when dry, they did not consist of the hydracid united to the base, but of the radical of the hydracid united to the metal of the base; and at present chemists are very nearly agreed in considering that even when dissolved in water, these substances are not proper combinations of a hydracid with a metallic oxide; but that under all circumstances, when a hydracid comes in contact with an oxide, water is disengaged, and a combination of the radical and the metal results, which may be put in contact with water without being decomposed.*

* In some few instances with the combinations of the more negative metals, water is decomposed, as where the chlorides of antimony or arsenic, the iodides of

A salt being formed by the union of an acid with a base, and as the hydracids do not combine with bases, but mutually decompose and are decomposed by them, it is questionable whether, in strict language, we could allow the Haloïd salts, as they are termed by Berzelius, to be retained in that class of bodies. I shall not here enter into the discussion, as it would be rather irrelevant to our immediate subject.

To the labours of the illustrious Berzelius, on the sulpho-salts, we owe most of our accurate knowledge of the salts. His discovery of the compounds formed by the union of different sulphurets first gave us an insight into the real nature of saline combinations, and enabled us to consider the properties and nature of acids and bases in a proper philosophic view.

It is not necessary here to enter into the explanation of the electro-chemical theory; it is sufficient to recall to the memory of the reader, that when two bodies in opposite electrical states combine, if they contain unequal quantities of electricity, exactly equal portions of each being neutralized, the whole resulting mass will be electrified in a manner similar to that of the body that previously contained most. If that body be negative, the compound will be negative; if positive, the body resulting from the union will be positive: then, sulphuric acid is negative, because the oxygen was more negative than the sulphur was positive; and potassa is positive, because the oxygen was less negative than the potassium was positive: the former (negative) substance is the acid, the latter (positive) is the base.

Now, Berzelius found that the sulphurets of the negative metals, &c. entered into combination with the sulphurets of the positive metals, &c., and formed compounds which possessed all the characters of salts. He therefore said, that just as oxygen forms oxacids by uniting to the negative substances, so does sulphur form sulphur acids by uniting to corresponding bodies;

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the same metals, &c. come into contact with much water, and an oxide of the metal and a hydracid are simultaneously formed, but they do not enter into combination. This is important to remark.

and oxygen and sulphur, by uniting with the positive metals, form the two classes of oxygen and sulphur bases. The sulphurets of the negative bodies are negative, and the sulphurets of the positive bodies are positive, and these two classes of bodies unite and form sulphur salts; thus, just as oxide of arsenic unites with oxide of potassium to form oxy-arsenite of potassa, so does sulphuret of arsenic unite to sulphuret of potassium to form sulph-arsenite of potassium.

This step at once fixed the before confused definition of what was or was not an acid, a base, or a salt. An acid must be a compound body, which is in a negatively electric state; a base, a compound body in the opposite state; and a salt is the substance formed by their combination. In the proper salts, the electro-negative principle is the same in both acid and base, and to these alone we shall here allude. Thus, in the oxy-salts, the acid and base both contain oxygen; in the sulpho-salts, the acid and base both contain sulphur, &c.

As oxygen and as sulphur act, so should also the other powerful electro-negatives. This at once developed the hitherto misunderstood nature of what had been called the double chlorides, the double iodides, &c. The double chloride of tin and ammonium was a chlorine salt, in which chloride of tin was the negative, and chloride of ammonium the positive principle; the double iodide of mercury and potassium was a salt where iodide of mercury was the acid, and iodide of potassium the base. There is no need of further examples from this class.

But what becomes of the salts of the hydracids on this principle. I would not wish to hazard an opinion. If the definition of a salt given above be correct, if the principles of electric combination be true, it is impossible to maintain their saline nature; but to deny the saline nature of common salt, to exclude from a class the very substance upon whose type that class had been founded; it would require one to whose opinion much respect would be paid.

But although we cannot receive among the class of salts the

combinations formed by the reciprocal decomposition of a hydracid and an oxy-base, yet still we are by the electro-chemical theory led to the investigation of the salts of the hydracids under another point of view; we should have hydro-chlorates and hydriodates, not by the action of hydrochloric or hydriodic acids on the oxy-bases, but on the chlorine or iodine bases. Thus, hydrochlorate of potassium would not be formed by the union of chloride of hydrogen with oxide of potassium, but with chloride of potassium, and the hydro-sulphate of potassium would be composed of sulphuretted hydrogen as the acid, and of sulphuret of potassium as the base.

For some time past I have been engaged in the examination of the combinations formed on this principle. I have succeeded in preparing some bodies, interesting both from the support they lend to this opinion respecting the salts, and from having led me to considerations on the electric relations of hydrogen and its compounds, of some importance. I purpose to communicate shortly an account of the new bodies; I shall, for the present, confine myself to the electric properties of the compounds of hydrogen, in order to render the observations on which, intelligible to those not acquainted with the relations of electrical with chemical science, it was necessary to premise the few foregoing observations.

My first object was to form the salts of the hydracids, and taking chloride of hydrogen, I attempted in every possible way to unite it to the chloride of potassium, chloride of sodium, of ammonium; but to no purpose. Neither would hydriodic acid unite to ioduret of potassium. (Berzelius had already formed the combination of sulphide of hydrogen with sulphuret of potassium.) Having totally failed in these attempts, I recollected that Dr. J. Davy had formed a crystallizable compound by uniting muriatic acid to corrosive sublimate, and that bin-iodide of mercury dissolves in hydriodic acid. But I knew that corrosive sublimate was one of the most powerful of the chlorine acids, and that the bin-iodide of mercury possessed similar proper-

ties; and hence these were the bodies that the hydracids should least of all be inclined to combine with. Therefore I determined on seeking more minutely into the matter than I had before intended.

On examining the systematic works, I found that muriatic acid entered into a number of combinations with chlorides, but without a single exception they were the chlorides of the electro-negative bodies. Thus it un˙tes to chloride of antimony, to chloride of gold, and chloride of mercury, but it cannot by any means be brought to combine with the chlorides of the positive bodies, as common salt or sal ammoniac. The principles of electric combination allow of but one inference from these facts; the chloride of hydrogen must be in a different state of electricity from those bodies with which it so readily unites, and must be in the same state with those with which it refuses to enter into combination. It must be positive, or it would not combine with the chlorides of gold and mercury, and have no disposition to unite to the chlorides of sodium or potassium. It must be positive, that is, the muriatic acid, one of the strongest acids that we know of, must be not only destitute of acid properties, but must act most intensely as a base.

This assertion is contrary to received opinion, but it is the only inference that legitimate theory allows us to deduce from well ascertained fact; we shall see that this is no peculiarity in chloride of hydrogen, but that the other combinations of hydrogen possess the same property, although in different degrees.

The electric properties of the compounds of hydrogen must, it is evident, be the resultant of the electricities of the hydrogen, and of the bodies to which it unites; and, therefore, in order to understand the electric relations of its combinations, we must examine what are the circumstances attending the union of hydrogen itself with other bodies.

With what substances does hydrogen unite? With oxygen, fluorine, chlorine, bromine, carbon, sulphur, &c.; but these are the bodies which, by uniting with oxygen, form acids, which

are negative with regard to the other principles, as the metals. If one of these hydracids be decomposed by galvanism, the radical is evolved at the positive, and the hydrogen at the negative pole of the battery; and hence we conclude that in these different combinations the hydrogen is the electro-positive element.

This fact has been long recognized by chemists generally speaking, viz., that hydrogen is positive towards oxygen, chlorine, &c.; but I rather think, that in forming the electro-chemical series, this principle has been represented as being much less positive than it really is. Thus, Berzelius makes hydrogen more negative than platina, gold, osmium, copper, mercury, &c.; but we know that hydrogen is capable of taking oxygen from the oxides, chlorine from the chlorides, sulphur from the sulphurets, &c. of those metals, and therefore must attract these negative bodies more powerfully than those metals do, that is, must be more intensely positive.

It is evident, therefore, that hydrogen is more positive than it has been considered by Berzelius; but it would be incorrect to go so far as Thompson, who maintains hydrogen to be the most positive of all bodies; for there are many metals, as the alkaline and the earthy metals, which have a much more powerful attraction than hydrogen for the electro-negative bodies. Thus, hydrogen will not deprive potassa of its oxygen, or common salt of its chlorine; on the contrary, potassium will in all instances take away oxygen from water, and chlorine from muriatic acid, &c. Hence we see that hydrogen occupies an intermediate place in the electrical scale; the immediate point we shall hereafter endeavour to ascertain.

We shall now pass to the proofs that the positive properties prevail generally in the compounds of hydrogen: a necessary consequence of the powerful positive energy of hydrogen itself; we shall examine some of the more important combinations of it with the electro-negatives.

Oxygen being the most powerfully negative body that we

know of, we would not expect that water should act positively; the hydrogen is not more positive than oxygen is negative; but no more does water act negatively; in the union of hydrogen and oxygen, the electric properties of both are neutralized as perfectly as in any instance that we are aware of, and the inertness of water as a chemical agent, in most instances, has been long recognized; it is used as the vehicle for bringing more active bodies into contact, as no counteracting affinities of its own complicate the phenomena, or interfere with the result.

But although water is thus inert, yet, as it contains an immense quantity of neutralized electricity, it is capable, when brought in contact with a body *intensely* excited by *either* electricity, of immediately assuming the opposite state, its electricity having been decomposed by induction; and it then unites powerfully with the body so presented to it, acting negatively if that body be positive, positively if that body be negative. Hence the firm combination of solid sulphuric acid and an atom of water. Still more remarkably the combinations of the nitric, oxalic, acetic, and other acids with water. It was customary to say that these acids could not exist except in combination with water, or with a base; but the water is here an oxy-base equally with potassa or oxide of lead. Let a sceptic mix strong sulphuric and strong liquid nitric acids together, and then state the difference between the decomposition of nitrate of oxide of hydrogen, and of nitrate of potassa, by sulphuric acid.

Substitute dry potassa for the acid in the former instance; induced by the positive potassa, the water becomes negative, and an acid which forms with the potash an anhydrous salt, expels the water, as one acid always expels another.

But from the exact neutralization of the electricities in water, several interesting consequences flow; the electricity of the water, induced by the contact of an excited body, remains always vastly inferior to that of the body which effects the induction, consequently the compound is always in the same

state of electricity as that body. Thus, aqueous sulphuric acid is scarcely less negative, and hydrate of potassa little less positive, than the dry substances. Also, the affinity of the water for these substances is exerted with force only when they are very intensely excited. It is difficult to separate the water from hydrate of potassa, or from sulphuric acid; but if we take a hydrate of an oxide of less energetic powers, we find that the water is united to it by but feeble ties. The peroxide of copper, the peroxide of tin, &c., unite with water, in which combination the latter is the positive element; but as the tin and the copper are but feebly negative, we find that a low heat, or even boiling in water, is sufficient to solve the bond of their connexion.

We might enter much more into these details, but enough has been advanced to prove that hydrogen is sufficiently positive to neutralize completely the most powerful of the electronegatives (oxygen) in water.

Combined with fluorine, hydrogen forms a body whose peculiar properties have procured for it considerable attention.

Fluorine is powerfully negative; it is equally so with oxygen, and hence the little disposition that these substances have to combine. We shall accordingly find the closest coincidence to run through their different combinations with other bodies.

The peculiar substances, boron and silicon, are negative; and hence the boracic and silicic acids formed by their union with oxygen. The similar combinations of fluorine are of course also negative, and the fluorides of boron and of silicon act as acids.

Now, two of the most common fluorine combinations are, the hydro-fluo-silicic and the hydro-fluo-boric acids. It is unnecessary to advert to their preparation. They are similar in nearly all their properties, and identical in their composition, substituting boron in the one for silicon in the other. We shall, therefore, for brevity sake, illustrate the relations of the one only, all that is said being equally applicable to both.

The hydro-fluo-silicic acid is composed of an atom of fluoride of silicon,* + an atom of fluoride of hydrogen; but there is no doubt that silicon is more negative than hydrogen, therefore the corresponding fluorides must be in the same relation. In this combination, therefore, we have the fluoride of silicon the acid, and the fluoride of hydrogen the base;* and the substance hitherto termed hydro-fluo-silicic acid must be regarded as a fluorine salt, a *fluo-silicate of hydrogen.*

The truth of this view is proved by the following experiment: Add to fluo-silicate of hydrogen an oxide of a metal more positive than hydrogen; of potassium, for example, the fluoride of hydrogen is decomposed, and fluoride of potassium (a more powerful fluorine base) being formed, oxide of hydrogen is expelled, whilst a fluo-silicate of potassium is the new salt generated.

Just as water is capable of being at one time negative and at another positive, so is the fluoride of hydrogen. If fluoride of hydrogen be put in contact with fluoride of potassium, it is rendered negative by induction, and combines with it just as water unites with potash. It is needless to adduce particular instances further; the general fact is evident from those which have been now brought forward.

Chlorine being less negative than oxygen or fluorine, the chloride of hydrogen must be more positive than water, &c. And this we accordingly find to be the case. Chloride of hydrogen unites to the chlorides of the negative metals, as bi-chloride of mercury, chloride of antimony, chloride of platinum, and chloride of gold, and forms with them well defined combinations, in which, as the hydrogen is far more positive than any of these metals, its chloride must be the base, and the metallic chloride the acid. The saline nature of these combinations, and the basic

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* It is scarcely necessary to remind the reader, that the fluoride of hydrogen is the same as the hydro-fluoric acid; the hydracid formed by the union of fluorine and hydrogen.

energy of the chloride of hydrogen, is thus proved : If we take the compound of muriatic acid and chloride of gold, and add an oxy-base, as potash, we decompose the chloride of hydrogen, and form chloro-aurate of potassium. Further, if we boil the chloro-aurate of hydrogen with chloride of potassium, chloro-aurate of potassium is formed, and chloride of hydrogen expelled ; and by mixing the chloro-platinate of silver with chloride of hydrogen, chloride of silver is separated, and chloro-platinate of hydrogen formed.

The chloride of hydrogen being thus energetically positive, we should naturally expect that it would not combine with the other positive chlorides ; this is the case, and it was one of the facts which first drew my attention to this subject.

The different iodine and bromine combinations resemble so closely those of chlorine, that it is unnecessary to enter into their examination. We shall, therefore, pass to the investigation of the relations of sulphuretted hydrogen.

Yes, says one, incredulous of that which I advance ; sulphuretted hydrogen, that is an acid at any rate, for Berzelius has examined and described the whole class of sulph-hydrates. True, the sulph-hydrates of potassium, sodium, and a few more of the sulph-hydrates of the most positive metals, have been formed, for if sulphur possesses but little power in neutralizing the positive energy of hydrogen, it has still less in counterbalancing the far superior positivity of potassium ; and, therefore, to sulphuret of potassium, and such sulphurets, the sulphide of hydrogen is negative, for the same reason that water is negative to potassa ; but the other more negative sulphurets must also be taken into consideration.

If we take a solution of sulph-hydrate of potassium, in which sulphide of hydrogen (sulphuretted hydrogen) is the acid, and sulphuret of potassium the base, and boil it with sulphuret of arsenic, we will find that the sulphide of hydrogen will be disengaged, and a sulph-arsenite of potassium will remain in solution : if we use sulphuret of antimony, or per-sulphuret of tin,

the same effect will be produced, and a sulph-antimonite, or a sulpho-stannate, generated. This proves that the sulphide of hydrogen is a much less powerful acid than many metallic sulphurets, and coincides remarkably with the cases before adduced. And not only is the sulphide of hydrogen less powerfully negative than the sulphurets of antimony and arsenic, but to these substances it is even positive; and hence the reason of the solubility of the per-sulphide of arsenic, and the per-sulphuret of antimony in sulphuretted hydrogen, a fact of which, although the distinct combinations of these substances have not as yet been isolated, every analyst must be aware.

But let us ascend into the combinations of sulphur with the more negative substances, and we shall have presented to us splendid instances of the positive action of sulphuretted hydrogen. The sulphuret of cyanogen unites to sulphuretted hydrogen, and forms a sulphur salt, the sulpho-cyanate of hydrogen, in which the sulphuret of cyanogen is the acid, and the sulphuret of hydrogen is the base; the correctness of this view is proved by the fact, that the addition of a more positive sulphuret produces the separation of sulphuretted hydrogen. Similar to this compound is that formed by the union of sulphide of carbon with sulphide of hydrogen, which is one of the extensive class of sulpho-carbonates investigated by Berzelius.

It is thus evident, that sulphide of hydrogen acts as an acid merely to the sulphurets of the alkaline and earthy metals, exactly as water acts as an acid to the similar oxides, but that when put in contact with the more negative sulphides, the sulphuretted hydrogen resumes its station as a base, determined by the intense positive energy of hydrogen.

We shall conclude these evidences by adverting to the combinations of cyanogen, a substance which, although we are aware of its composition, acts throughout all its combinations in a manner similar to the simple bodies, and, therefore, may here be treated as one of them.

Many genera of the cyanogen salts have, by the labours of

continental chemists, been proved to exist; but as in such a subject none but generally admitted facts could be allowed of weight, we shall merely bring forward the two most common genera of this class, viz. the cyano-ferrites and the cyano-ferrates, salts, in which the cyanides of iron (corresponding one to the protoxide, and the other to the peroxide of that metal) are the acids.

The protocyanide of iron unites to the cyanide of hydrogen, and forms the substance commonly termed ferro-prussic acid. This acid, like the hydro-fluo-silicic acid, the hydro-xanthic acid, &c., is in reality a salt, a cyano-ferrite of hydrogen. By replacing the cyanide of hydrogen by cyanuret of potassium, we form the cyano-ferrite of potassium, the common yellow prussiate of potash so generally used as a test for the per-oxide of iron. The per-cyanide of iron, uniting to cyanide of hydrogen, forms the red ferro-prussic acid, or, properly speaking, the cyano-ferrate of hydrogen. By replacing the cyanide of hydrogen in this salt by cyanuret of potassium, we form the cyano-ferrate of potassium, or red prussiate of potash, used in detecting iron in the state of protoxide.

Since cyanide of hydrogen is so positive as to form such well defined combinations with cyanides so feebly negative as those of iron, it is sufficiently apparent that it would have but little power to enter as the negative element into combination with the cyanurets of the alkaline metals. Such is accordingly the fact. There is no instance known of prussic acid acting as an acid.

From the facts thus brought forward, there can be no hesitation in allowing the truth of that proposition, which, when first advanced, appeared so startling, that the substances hitherto termed hydracids, do not enter into combination as acids, except in some very few instances, where the presence of one of the alkaline or earthy metals gives to the hydrogen a feeble trace of transient negative action.

But that with these few exceptions the compounds of hydrogen, when they enter into combination without being decomposed, are the positive elements of these combinations, and that the oxide, chloride, cyanide, sulphide, &c. of hydrogen act as bases of considerable power, surpassed in activity only by the similar compounds of the alkaline and earthy metals.

It is interesting to determine, from the facts that we are at present acquainted with, what is the exact place of hydrogen in the electro-chemical series of the simple bodies. The scale laid down by Berzelius is the following, commencing with those most energetically negative :—

Oxygen	Titanium	Nickel
Sulphur	Silicium	Iron
Nitrogen	Hydrogen	Zinc
Fluorine	Gold	Manganese
Chlorine	Osmium	Cerium
Bromine	Iridium	Thorium
Iodine	Platinum	Zirconium
Selenium	Rhodium	Aluminum
Phosphorus	Palladium	Yttrium
Arsenic	Mercury	Glucium
Chromium	Silver	Magnesium
Molybdenum	Copper	Calcium
Tungsten	Uranium	Strontium
Boron	Bismuth	Barium
Carbon	Tin	Lithium
Antimony	Lead	Sodium
Tellurium	Cadmium	Potassium.
Tantalum	Cobalt	

To this mode of arrangement there are many serious objections. If sulphur be more negative than fluorine, oxygen should be more disposed to unite with fluorine than with sulphur, while we know that the reverse is the fact ; also, the history of the silicium

compounds prevents us from allowing that simple body to be more positive than antimony or than carbon; and if nitrogen was more negative than chlorine, the latter would not so readily decompose ammonia. Among the metals, also, the place of many are inconsistent with some of their most remarkable properties. Thus, copper cannot be more positive than silver, for oxide of silver throws down oxide of copper from its solutions. The place of hydrogen we have already animadverted on.

Thompson (Inorganic Chemistry) considering that the electric relations of the metals towards each other are too little known to allow us to make any attempt at arranging them, leaves them out, and forms the following scale of the non-metallic bodies, beginning with the most positive:—

Hydrogen	Phosphorus	Bromine
Boron	Selenium	Chlorine
Silicon	Sulphur	Fluorine
Carbon	Azote	Oxygen.
Arsenic	Iodine	

This arrangement agrees very well with observation, but his error of supposing hydrogen positive with respect to every body, renders that portion of his scale totally inadmissible.

Although having thus mentioned some of the inaccuracies of the existing arrangements, it is not my intention to present one capable of supplying all wants; it is much easier to detect error than to avoid it. There are many substances of which we have not yet data for determining the exact places; and as far as I can judge, from some investigations as to the influence of the other physical agents, and of the mode of molecular arrangement on the relative situations of bodies in the electro-chemical series, it will be necessary to take into consideration many circumstances to which we at present pay little attention, and of whose action we are almost entirely ignorant; the mere passage of a body from one state of aggregation to another frequently effecting a profound alteration in its electrical relations.

With regard to hydrogen, however, it may be necessary to mention what I consider may be *probably* its proper situation. According to my observations, it may, without doing any great violence, be placed below iron and zinc among the metals of the earths in the arrangement of Berzelius. This remark, however, applies only to hydrogen in the highly elastic form under which we universally meet it when uncombined.

Art. XVIII.—*Observations upon the Management of the Placenta in Natural Labour.* By Henry Maunsell, M.D., Member of the Royal College of Surgeons in Ireland, and Lecturer on Midwifery in the Medico-Chirurgical School, Park-street.

There are few situations in which a practitioner of midwifery can be placed, more irksome than that in which he has to await the tedious separation of the after-birth. "The minds of all women," says Denman, "are full of solicitous fears till the placenta is brought away;" and the accoucheur, who can listen with indifference to the expression of their anxiety during this period, must have a more than ordinary share of confidence or apathy. But independent of due consideration for the feelings of our patient, and even these should never be neglected, we have enough to make us anxious for the completion of this last stage of labour, when we recollect the imminent hazards to which, according to the best authorities, she is liable in the interim. In the first place, it is possible that the powers of nature may not be sufficient for the expulsion of the placenta, and its retention being an obstacle to the efficient contraction and closure of the uterus, a continued risk of hemorrhage will be thereby kept up. Secondly, even should dangerous hemorrhage not occur, we have upon record more than one remarkable case in which fatal fever was the result of the putrefaction of this vascular mass within the cavity of the uterus. To those unhappy consequences of an imperfect delivery, it is at present only

necessary to allude, the able manner in which they have been treated of by many authors leaving little to be said upon the subject. Notwithstanding, however, the acknowledged merit of those elementary works upon midwifery usually in the hands of practitioners, it is to be regretted that some deficiencies exist in their accounts of the management of the placenta. By pointing out a few peculiarities in the mode of conducting the latter parts of the process of labour as adopted in the obstetric schools of this city, it is hoped that those deficiencies may be in some measure supplied, and a more settled line of practice suggested to the junior members of the profession. Should this hope be, in the smallest degree, fulfilled, the object of the following observations will be accomplished :—

When considering how retention of the placenta is to be prevented, it is very correctly remarked by Dr. Burns, that "it will be less apt to be retained if the expulsion of the child be conducted slowly, and the uterus made to contract fully upon it." Similar opinions are advanced by Drs. Denman and Merriman, the former advising us in some cases "rather to retard its final expulsion than to use any force or hurry in extracting it." The latter part of this advice can never be too strongly impressed upon our minds; but for any attempts at *manually* retarding the expulsion of the child, it appears difficult to find sufficient justification. Independent of other arguments against such a practice, it must be allowed that the expulsive powers of the uterus are, like every other power exerted in the body, liable to fatigue. Now, if we produce this condition of fatigue by causing the efforts of the organ to be continued longer than nature had intended, it is fair to suppose that the consequence will be, not a speedy expulsion of the secundines, but a prolonged interval of repose and inactivity. Such a state is precisely the one we wish to avoid, and to effect our wishes, our conduct must be guided, not so much by a desire to retard the labour, as that it shall be accomplished solely by the action of the uterus, and that the latter shall be made to contract fully upon its contents.

For insuring both objects, a rule of practice, first pointed out to me by my friend and former master Dr. Johnson, has been adopted in the Wellesley Female Institution with such success, that we scarcely ever meet a retained placenta, and very rarely, indeed, have a case requiring the introduction of the hand into the uterus. The spirit of the rule is, never to allow the uterus to relax after the child has been expelled. For this purpose, the moment the perineum is out of danger by the passage of the head and shoulders through the vulva, the left hand of the accoucheur is to be placed upon the abdomen of the patient, and with moderate but firm pressure, the uterus to be followed down into the pelvis as it contracts upon and expels the body and limbs of the child. This being accomplished "to the very toes," the womb will be felt hard and firmly contracted; and that no interval may be allowed for relaxation, the practitioner, before he proceeds to separate the funis, is to cause the nurse to pass her hand over his, that immediately upon his withdrawing it she may keep up similar and as effective support. By this prompt and continued employment of pressure, it is obvious that several advantages will be attained. The syncope, from mere vacuity of the uterus, which has been known to take place to a very alarming, if not fatal, extent, will be most probably prevented. The tendency also to secondary relaxation which sometimes exists, will be obviated, and the uterus kept closed upon its contents, while at the same time the benefits of friction in the excitement of contraction will be fully procured. In the works of the three authors already mentioned, and to which, as being the usual text books in this country, these remarks are particularly directed, we find frequent allusions to the advantages of pressure and friction. By them, however, they are rather mentioned as means for remedying an existing retention or hemorrhage than as preventatives of either of these occurrences, and accordingly their employment is not spoken of until after the complete delivery of the child.

Another important discrepancy between the management of

the placenta as it is laid down in the books and as it is taught in this country, will be found in the use of "the binder." Denman absolutely prohibits its employment "as useless and pernicious" until five or six days after delivery. Merriman mentions it as a valuable means for preventing hemorrhage, but only speaks of it in those cases in which flooding is expected. Dr. Burns does not recommend its use until the placenta has been expelled. In this city, on the contrary, it is the practice to apply it the moment the child is separated from the mother, and there can be no doubt that it acts a most important part in procuring a favourable separation of the after-birth. The reasons for its immediate employment will of course be obvious from what has been already said of the advantages of early pressure. The mode of its application requires a few remarks. In the first place, the nurse should never be suffered to withdraw her hand from above the uterus until we are ready to tighten the binder; and secondly, in pinning it, we should always commence at the lower edge, and be careful that this be placed below the trochanters.* By these precautions, we prevent the binder from slackening by slipping upwards, as the tapering form of the hips would otherwise incline it to do. When the latter stages of a labour have been conducted in the manner just described, the result in a very great majority of instances will be a speedy and safe separation of the placenta without any further interference whatsoever. Generally the whole process will be completed within fifteen or twenty minutes. Should it, however, be protracted a few minutes longer, if no alarming symptom presents itself, we need not feel uneasy, the average laid down by Dr. John Clarke of twenty-five minutes as the length of time for its natural accomplishment appearing to be tolerably correct. If in any case expulsion does not take place within half an hour, we will generally find that

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* The greatest fault in the binders commonly used, is their narrowness; they should be broad enough to reach from the ribs to below the trochanters.

the binder has become slack, and by tightening it again, if necessary, placing a compress under it, and using moderate friction and pressure over the uterus, we will very often be able to excite contractions amply sufficient for our purpose.

Upon two points advanced by Dr. Denman, I would now wish to offer a few remarks. The first is, the permission which he gives to extract the placenta by pulling at the cord. Although attentive consideration of the passages in which he appears to sanction this practice could not lead any one to employ the slightest degree of injurious violence, still, as the generality of readers are much more apt to interpret the words of so justly esteemed a writer literally, than to take the trouble of ascertaining the real meaning of his directions, there can be little doubt that his doctrine upon this subject has been in many instances productive of evil. It seems then decidedly better to lay it down as a general rule, that no traction is to be made upon the cord as long at least as the placenta remains within the cavity of the uterus. When the plan already laid down has been fully and properly pursued, it will in scarcely any instance be required; and any idea conveyed by the expression "moderate force" must be so indefinite as always to leave more or less risk of such being employed as may produce either laceration of the funis or inversion of the uterus. In addition to the hazard of these accidents, Dr. Douglas has pointed out to us, in his valuable Paper in the Medical Transactions, that pulling at the cord may be itself an indirect cause of retention of the placenta by irritating the os uteri, and thus giving rise to the spasmodic contraction of the lower fibres of its body, which he conceives to constitute the hour-glass contraction. The fact is, when the use of the binder and friction upon the uterus are not sufficient to cause expulsion of the placenta, this effect can seldom be produced by pulling at the cord. We may put it gently on the stretch, and thus, perhaps, excite uterine action; but if this fail, there is then no resource but the introduction of the hand, an operation which we must never forget is most justly interdicted by Dr. Denman, "except as a matter of necessity."

The other point upon which we proposed to remark, is, the direction of Denman to let the placenta remain in the vagina until it is excluded by the pains, whether it has been naturally expelled from the uterus, or drawn out of it by the gentle pulling of the funis. In the generality of cases, this delay appears to be unnecessary, and only calculated to keep up the anxiety of the patient; and there will usually be no risk in removing the secundines from the vagina immediately after they have been driven out of the uterus. In doing this, it appears to me to be still unadvisable to extract by the cord, as we thereby bring against the opening the broadest surface of the placenta. On the other hand, when any difficulty occurs, we shall very much facilitate the operation if we hook a finger into its substance, and then draw it edgewise, and with a slow rotatory motion through the os externum.

One set of circumstances, however, does occasionally occur, in which the rule for leaving the placenta in the vagina will be found most valuable and necessary. These circumstances exist when, together with sufficient disposition to contraction on the part of the uterus, there is so much disturbance of the circulation as to lead us to dread the peculiar form of hemorrhage first described by Dr. Gooch. Should a case, for example, occur in which the uterus having acted sufficiently to expel the afterbirth into the vagina, could be felt in the hypogastrium contracted into a firm, hard ball, but at the same time the red flushed face and rapid throbbing pulse of the patient denoted high vascular excitement, we ought at once to desist from farther interference until by an interval of repose, and the free admission of cool air, tranquillity be again restored. In this instance, we could not have a better plug than the placenta, while by careful adjustment of the binder, and the employment of friction, we might hope to keep up the contraction of the uterus, and effectually provide against the occurrence of internal hemorrhage.

With respect to the management of those cases, very full in-

formation will be found in the Papers of Dr. Gooch; and for the treatment of hemorrhage in general, the systems of Denman and Merriman, and of Professor Burns, may be consulted with much advantage.

Art. XIX.—*Observations on the Treatment of various Diseases.* By Robert J. Graves, M. D., M. R. I. A., King's Professor of the Institutes of Medicine.

(*Continued from* p. 156.)

TARTAR EMETIC IN CERTAIN CHRONIC DISEASES.

In persons of a weakly habit, and in those who have passed the meridian of life, it sometimes happens that the symptoms of an acute disease, *particularly bronchitis*, subside, leaving the patient, however, in an extremely debilitated state, free from fever, but entirely destitute of appetite.

In such cases, day after day passes away without any increase of strength, while nothing is complained of but weakness and total want of appetite. The skin is cool, the pulse indicates no remnant of fever, respiration is free, the abdomen feels soft and natural, and the alvine discharges exhibit nothing to account for the remarkable want of digestive energy on the part of the stomach.

In this state of the patient, the most constant and peculiar symptom is the appearance of the tongue, which is always moist, and has its whole upper surface covered with a remarkably thick, white, smooth, and tenacious paste. Nausea is seldom complained of, neither is inconvenience experienced from thirst, or bitter taste in the mouth, but whatever food is taken appears nearly tasteless and insipid, and the tongue and mouth feel clammy and uncomfortable.

This state has been long noticed by physicians, and various remedies proposed for its removal. The most obvious mode of

proceeding is the exhibition of purgatives, followed in due time by tonics; and when this method is pursued with judgment, it will prove successful. Tonics, in the first instance, and while the tongue is in the state above described, are always injurious. Two cases occurred last winter under my care in the Meath Hospital, which excited much interest on account of the previous obstinacy of the disease, and the rapid improvement which attended the adoption of means believed by most of the students more likely to injure than to serve the patients. The following was the method of treatment employed, and I have found it, in several other cases of a similar nature, very effectual in restoring appetite and promoting convalescence:—

The patient is put on low diet, consisting of white bread and whey; milk is altogether interdicted, as it invariably appears to aggravate the symptoms. During the day, the patient takes every hour a table-spoonful of a solution of tartar emetic in twelve ounces of water; if it nauseates the stomach, the dose is to be diminished. This plan is persevered in for two days, and an emollient enema is administered in the evening, if necessary. On the third day, the same plan is continued until dinner time, when the patient gets meat and vegetables, and is encouraged to make as hearty a meal as possible. In an hour after this, an emetic, consisting of twenty grains of ipecacuanha and one grain of tartar emetic, is exhibited, and vomiting promoted by copious draughts of tepid water; during the two following days, the low diet and minute doses of tartar emetic must be resumed, and on the third day again the full dinner and emetic.

During this course, the tongue gradually becomes clean, the desire for food increases, and the general health and strength improve rapidly, when the patient is allowed a more nourishing diet, which, however, must be done with great caution and judgment.

It is an old opinion, that tartar emetic in minute doses possesses a peculiar efficacy in softening and detaching the viscid

mucus which in these cases loads the surface of the tongue and stomach, and impedes the healthy discharge of the digestive function. Whether the physiological reasonings of our predecessors on this subject are admissible in the present state of science, I shall not stop to examine, my object being now limited to a statement of the fact as practically useful. I was induced to give the emetic after a full dinner on the third day partly in consequence of some observations of Hippocrates, and partly because it seemed very probable *a priori*, that an emetic on a full stomach would not only cause less distress during its action, but would also prove more effectual, the vomiting being induced at the moment the stomach is engaged with the greatest activity in carrying on the process of digestion, when it is most copiously supplied with blood, and pours forth its peculiar secretion in greatest abundance. Be this as it may, the above plan of giving emetics after dinner, previously exhibiting minute doses of tartar emetic, has seemed to me more useful in many chronic diseases than the usual method of exhibiting them. I can particularly recommend it in cases of obstinate headach, depending on a deranged state of the stomach.

HABITUAL CONSTIPATION.

In many chronic diseases, and in habitual constipation, it is of the greatest consequence to procure daily and regular discharges from the bowels. *Lavements* effect this purpose most conveniently, and possess the advantage of not interfering with or weakening the digestive functions of the stomach and upper portion of the alimentary canal. Many persons, however, particularly females, have an insuperable objection to this method of obtaining relief, and acquire the habit of taking aperient medicines whenever their bowels are confined.

Various causes have combined to render blue pill and calomel almost popular remedies, to which many have recourse when their bowels are irregular, or the stomach out of order.

Indeed, it is quite incredible what a number of persons are in the habit of taking these preparations, either by themselves or combined with other purgatives, whenever, to use the common expression, they feel themselves bilious. This habit sooner or later induces a state of extreme nervous irritability, and the invalid finally becomes a confirmed and unhappy hypochondriac; he is, in fact, slowly poisoned, without the more obvious symptoms of mercurialization being at any time produced.

It is almost unnecessary to observe, that although saline aperients give temporary relief, they afterwards increase the tendency to constipation, and weaken the stomach. The class of purgatives least liable to objection consists of magnesia, aloes, rhubarb, colocynth, &c., for exhibiting which many well known and excellent formulæ are used. But even these substances, whose debilitating effects on the stomach are not near so great as that of mercurials and salts, are attended with the disadvantage of being required in larger doses in proportion as the bowels become accustomed to their action. To remedy this evil, Dr. Elliotson has suggested a valuable combination, consisting of compound extract of colocynth with minute doses of croton oil. This I have frequently given with the best effects; but it is liable to a serious objection, for unless the croton oil be perfectly mixed with the mass, some of the pills may be too powerful, while the others are comparatively inert, and consequently the patient is exposed to the danger of hypercatharsis, as I have twice witnessed, although in both cases the medicine had been prepared in the shop of a respectable apothecary. The following combination will, in general, serve to obviate costiveness, without diminishing the appetite, or being attended with the necessity of the dose being increased as the patient becomes accustomed to its use :—

℞ Electuarii Sennæ ℥ii.
Pulv. Supertart. Potassæ ℥ss.
Carbonatis Ferri ʒii.
Syrupi Zingiberis q. s.
Ft. Electucarium.

For the first few days I generally add about two drachms of sulphur to this electuary; but as soon as its operation has been established, the quantity of sulphur may be diminished one half, and at the end of a week it may be omitted altogether. The dose must be regulated by its effects, but in general a small tea-spoonful in the middle of the day and at bed-time will be sufficient.

The value of the carbonate of iron as a tonic aperient has not been duly appreciated; I have succeeded in curing, with it alone, a practitioner of eminence in this city, who had been long subject to extreme constipation, and had been reduced to the necessity of taking an enormous dose of purgatives almost every week.

When injections carefully administered with Read's syringe fail to remove obstinate constipation, which they will sometimes, though rarely do, other means must be resorted to. Some practitioners are in the habit of giving one dose of active purgatives after another, adding to the strength of each dose in proportion to the obstinacy of the case. This is an imprudent and hazardous mode of proceeding. In such cases, the stomach will generally be capable of retaining castor oil; and I prefer giving repeated doses of this medicine to any other when the bowels display such an unusual degree of obstinacy, in as much as it may be safely accumulated in the alimentary canal, and will in the end procure evacuations without any of the dangers which attend repeated doses of acrid and drastic substances. I generally commence with two ounces, to be repeated every second hour until the desired effect is produced. I do not recollect who it was first made the important observation, that in obstinate constipation the first dose of castor oil must be large, but when this has acted on the bowels, the dose may be gradually diminished, provided that the medicine is continued every day for some time. I have verified this in private practice, and lately had a patient in the Meath Hospital whose bowels had resisted injections and the strongest cathartics. Three ounces of castor oil continued for two days in succession, two ounces

on the next day, and one ounce on the fourth, were found quite effectual. In some, the daily dose may be thus gradually diminished to a tea-spoonful at bed-time.

When the tendency to constipation is habitual, and the patient is not effectually relieved by the daily use of injections, and when the peculiar circumstances of the complaint render the administration of aperient medicines by the mouth inadmissible, great advantage may be derived from the application of purgative liniments to the abdomen. The one I have found most useful consists of four parts of castor oil and one part of tincture of jalap. This must be diligently rubbed into the region of the stomach every morning before the patient rises, and it must be done under the bed-clothes, least the unpleasant odour should sicken the stomach. I am indebted to a medical friend for this suggestion, which I used with success in the case of a young gentleman, whose state had become almost hopeless.

In constipated habits, I have likewise occasionally derived very remarkable benefit from the use of nitric acid given in sufficient doses. It seems, like the carbonate of iron, to possess the advantage of combining tonic with aperient qualities.

In connexion with this subject, I may remark, that long continued and repeated attacks of constipation, by enlarging the cæcum and colon, lay the foundation of other diseases. This happens most frequently in females, but is not uncommon among males. In such cases the enlargement of the guts may occasion either of two distinct forms of disease, both attributable to the retention and accumulation of hardened fæces. In one form the symptoms are calculated to mislead the medical attendant, by inducing him to believe that his patient is labouring under chronic hepatitis. Pain and tenderness, and in some, hardness, or even a degree of enlargement, are perceptible in the right hypochondrium, while the patient's aspect is bilious, and he not unfrequently complains of pains in the right shoulder. At times he is subject to violent fits of colic, or to what he com-

pares to cramp in the stomach, particularly after the bowels have been confined, after eating vegetables calculated to generate flatulence, or after exposure to cold.

In the other form, the general health suffers less; the pain and other local symptoms referred to the right hypochondrium are not complained of, but the patient is occasionally subject, particularly on exposure to the action of the causes before enumerated, to violent attacks of vomiting and pain in the belly, which are accompanied by the characteristic symptoms of intestinal obstruction. The circumstance that the immediate attack was apparently induced by some palpable and known cause, such as an error in diet, or exposure to cold, may here deceive the practitioner, and cause him to overlook the fecal accumulation, without whose removal recovery cannot take place. I and two other practitioners were several times deceived in the case of a gentleman, of a robust constitution and great strength of body; and the true cause of the sudden and dangerous colics to which he was subject, was not discovered until he happened to mention, that when a young man, he seldom went to stool more than once a week. This led to the suspicion of an enlarged colon, and ever since the attacks have readily yielded to large injections administered by means of a Read's syringe, without which instrument he now never ventures to travel. The practical point that strictly claims our attention, is, that the period of life at which the patient becomes subject to these attacks, is often long subsequent to the cessation or diminution of the habit of constipation, and consequently the physician will not perceive the true cause of the complaint unless he questions the patient very accurately.

ON THE USE OF WINE AND OPIUM IN FEVER.

I have long endeavoured to impress on the minds of students the great importance of studying with attention that stage of fever in which wine and opium are occasionally the best reme-

dies, with a view of learning what symptoms indicate their exhibition. In the commencement of fever, we can decide with a good deal of certainty upon the most proper course of proceeding, but as the disease advances, the symptoms become more complicated, the indications more confused, and the plan of treatment consequently doubtful. In this stage of fever it is that we must rely on the tact acquired by previous experience and reflexion, and must often depend more upon a correct estimation of the general state of the patient, than upon the appearance or absence of any particular symptom. It is not my intention at present to do more than prove the truth of this assertion, by shewing that the presence of some symptoms, commonly supposed to contra-indicate the exhibition of wine and opium, ought not to deter the practitioner from their use, provided that other circumstances seem urgently to require it:—

1st. In the first place, as to the tongue, *at an advanced period* of fever, I have often derived the greatest advantage from wine and opium, although the tongue was dry, the colour of old mahogany, or else coated with a yellowish-brown dry fur, and protruded with difficulty, while the teeth and gums were covered with sordes. Wine or porter in moderate quantities seem *generally* to agree better with this tongue than opium; in some cases, however, the latter is indispensable.

For fear of misleading the reader, I must again remark, I by no means wish to assert that such a tongue uniformly, or even frequently, indicates the use of these medicines; on the contrary, this state of tongue and mouth will often be observed at a time when leeches and the antiphlogistic treatment are required. Let it be clearly understood, however, that at an advanced period of fever, this state of tongue may exist, and yet wine and opium may be given boldly, provided, as I have said before, the general state of the patient seems to require it.

2dly. The observations I have made concerning the tongue are applicable to *suffusion of the eyes.* The eyes may be heavy, a little red, very much suffused, and may have the singu-

lar expression of watchfulness combined with great redness of the conjunctiva, which is termed a ferrety eye, and yet wine or opium may be the only remedies capable of saving the patient's life. It should always be borne in mind, that want of sleep tends to make the eye red.

3dly. A hot and dry skin does not necessarily contra-indicate the exhibition of wine or opium, particularly where there is at the same time a tendency to coldness of the extremities.

4thly. The presence or absence of delirium must always excite our attention when the question of giving wine or opium arises. I believe that these medicines are never applicable when the delirium is violent and continuous; but the patient may rave a great deal, particularly at night; he may mutter and speak to himself, he may point to various imaginary appearances, and may fancy himself surrounded by persons or things which have no real existence; he may be restless and irritable, constantly endeavouring to leave his bed for the purpose of walking about the room or sitting at the fire; and yet he may be in a state urgently demanding wine or opium. On a more accurate examination, we find that his delusions are not so strong as to leave no room for the exercise of his reason. When spoken to emphatically, he answers in some cases incoherently, but in others with perfect precision and presence of mind, and does not for some minutes relapse into his former wanderings. This state of mind is usually accompanied by an almost total want of sleep, and in many, by a great anxiety about their illness. To procure sleep, as has been well remarked by Dr. Latham, in a late number of the Medical Gazette, is here one great object, and this can only be done by means of wine and narcotics. In some, the mental aberration is scarcely perceptible, and they have all the characters of great excitement of the nervous system, without any actual raving or delirium. There is general tremor and subsultus. The tongue is tremulous when protruded, or when moved in speaking, and consequently the articulation is uncertain and interrupted, while in general man-

ner and mode of answering questions the patient strongly resembles a person affected with delirium tremens. This group of symptoms is likewise accompanied by want of sleep, and best treated with wine and opium.

5thly. The appearance of the face has been much relied on by some, as capable of guiding us in forming our decision. Heat of head and face, redness of the cheeks, and strong pulsations of the carotids, are well known as contra-indicating wine or opium; but in the advanced stages of fever, the face, like the eye, may be suffused, it may be even occasionally flushed, and when flushed, it may be hot, and yet wine and opium may, nevertheless, be our only resource.

6thly. Headach, when violent, is at any period of fever a decisive circumstance; sleep cannot be obtained while the pain is unmitigated, and we must therefore attempt to conquer it by the most active treatment, by local applications to the head, by depletion from the vascular system, and by purgatives. Sometimes, however, these means fail, and the physician feels that he cannot pursue this mode of treatment any further. Under such circumstances, a dose of opium boldly exhibited will occasionally succeed in procuring sleep, from which the patient awakes nearly free from headach. Before having recourse to this remedy, the effects of a blister to the nape of the neck ought to be tried. In the more advanced stages of fever, the headach, or rather the heaviness felt in the head, is something very different from the throbbing, acute headach, just spoken of, and constitutes no contra-indication to the use of wine and opium.

7thly. The state of the pulse requires to be duly considered. Its frequency is not of much importance, for I have seen wine and opium prove highly serviceable in all its varieties, from 70* to 130, or even upwards. No one would ever think of exhibiting

* Last winter we had several examples in the Meath Hospital of the pulse being under 70, and regular, in a very bad type of fever, with parched tongue and raving.

these remedies when the pulse is strong, and more particularly when it is strong and hard; but the case is otherwise when it possesses only a certain degree of *hardness*, and is at the same time small and thrilling, not resisting compression with the force the sensation of its hardness leads us to expect.

Such are the chief observations I have made on the particular circumstances and symptoms supposed capable of throwing light on this important practical question. They may serve to prevent the student from being misled by rules of practice dogmatically deduced from the observations of any single symptom, and may lead him to turn his attention more accurately to the previous progress of the fever, and the general state of the patient. With regard to the means of bringing the system under the hypnotic influence of opium, I have nothing new to offer, except that I have latterly observed the greatest benefit in fevers from a small starch injection containing a sufficient dose of tincture of opium. A drachm of laudanum administered in this way has proved successful when large doses of black drop and other preparations of opium given in draughts had produced no beneficial effect.

It is almost superfluous to add, that when any doubts exist concerning the propriety of giving wine or opium in fever, they should not be tried unless their effects be carefully watched by the physician himself.

MILK POWDERS.

About six years ago, a lady came to Dublin to be confined at her mother's house, where I happened to be in attendance on another member of the family. A few days after the accouchment, I was informed that she was in great distress on account of having so scanty a supply of milk that it was declared impossible for her to go on with the nursing. Under these circumstances, and as her medical attendant had given up the matter as hopeless, her mother applied to me for something

likely to produce the desired effect. Upon inquiry, I found that her daughter, who was a strong, healthy young woman, was peculiarly anxious to be able to nurse this her first child, and could scarcely rest, so frequently did she give the child the breast, in order to try whether, to use a vulgar expression, the milk was coming. I immediately suspected that her over-anxiety about the matter, and the manner in which her whole attention was constantly turned to the secreting organ, had a sinister influence upon its functions, and thus prevented the secretion of milk. My object, therefore, was to divert for a time the current of her thoughts from that subject, in order to give the mammary glands an opportunity of performing their office undisturbed by her state of mind. To accomplish this, it was necessary to defer her hopes of having a supply of milk to some future day, and I therefore gave her powders, consisting of calcined magnesia and aromatic powder, which I assured her would have the effect of bringing abundance of milk to her breasts at the expiration of two days. I directed that one of the powders should be taken every third hour, both night and day, and that the infant should not be put to the breast until the two days had elapsed. I laid great stress upon their being taken precisely at the hours specified, and told her not to uncover or examine the breasts until my next visit. The powders were marked German milk powders, and their whitish colour I hoped would favour her confidence in their efficacy. My expectations were realized; before twenty hours the flow of milk was abundant; and in two days afterwards I had a visit from her accoucheur, who came to beg, as a special favour, my recipe for the German milk powders!!

MELÆNA IN FEVER.

It has been satisfactorily proved by modern investigations, that the dark-coloured matter similar in appearance to coffee-grounds which is discharged from the bowels in this disease

and yellow fever, consists of the coagulum of blood broken down and darkened in tint by the acids of the intestinal canal. I had lately an opportunity of observing a fact strikingly corroborative of this explanation. A young gentleman laboured under very severe fever, with violent headach, and was attended by the Surgeon-General and me. On the seventh day of his illness, two leeches were applied to the internal surface of his nostrils, and produced a very copious flow of blood, large quantities of which were swallowed by the patient during his sleep. In thirty-six hours after the bleeding had ceased, the nurse-tender became very much alarmed on observing the blackness of the alvine discharges. She told the family that it was a very dangerous symptom, and I was sent for in great haste. I need scarcely add, that on seeing the evacuation of so large a quantity of matter resembling coffee-grounds, the true explanation of the occurrence immediately suggested itself, and enabled me to dispel the alarm of my patient's parents.

When blood is swallowed by a person in health, whose digestive organs are vigorous, it never forms any thing like coffee-grounds in the large intestines, but is thoroughly digested and absorbed in the superior portion of the alimentary canal.

GASTRODYNIA.

The pain in the stomach accompanying gastric inflammation, and long continued organic disease, is not included within the meaning of *gastrodynia*, which, therefore, denotes only the pain that occurs in dyspeptic, nervous, and hysterical diseases, and supposed to be of a neuralgic character.

In some cases its neuralgic nature is sufficiently evident, for the attack of pain is often suddenly produced by something affecting the nervous system, as anxiety, alarm, anger, &c.; and its commencement in such cases appears at times totally unconnected with any previous derangement in the act of digestion. In the case of a medical man of eminence who lately consulted

me, the pain is for the most part induced by the causes just enumerated; is sudden in its appearance, and when it subsides, leaves no traces behind; some of the paroxysms have even continued several days, but were not followed by tenderness of epigastrium, diminution of appetite or digestive energy, or foulness of the tongue. This is the more remarkable, as the pain he suffers is excruciating. The first attack took place twelve years ago, at which time he was about fifty years of age, and of robust frame. It lasted three days and nights, with scarcely any intermission or abatement. Since that period, the paroxysms have frequently returned, but seldom last more than four or five hours; lately, however, Mr. Houston and I visited him during a very severe attack, which continued two days, and had been induced by mental anxiety. Though the chief exciting cause is any violent impression on the nervous system, yet certain articles of diet which disagree with the stomach also produce pain. Walking, particularly after dinner, is apt to produce pain, with eructation of wind; and a walk long enough to fatigue him considerably, never fails to bring it on. Most usually the attacks commence several hours after he has been asleep, and awake him at one, two, or three o'clock in the morning. This latter circumstance confirms the conclusion that the disease is neuralgic.

The pain is not relieved by spirit of turpentine exhibited either by the mouth or in injections, and no permanent benefit whatever is derived from any opiate or narcotic; occasionally, when the pain is excessive, he takes large doses of opiates, but they act merely as palliatives, and in proportion to the quantity taken, produce very little effect in diminishing his sufferings. Carbonate of iron, in doses of ten grains three times a-day, and continued for a week or a fortnight, has appeared more serviceable than any other medicine when the paroxysms were frequent in their recurrence. Magnesia, bicarbonate of soda, and soda water, taken in the evening, he has found soothing, and he says they produce a permanent good effect. Subnitrate of bis-

muth had not afforded any relief. In this case the pain in the stomach did not depend on that state of the digestive organs in which acidity is the prominent feature; neither was it attended with pyrosis, properly so called; and accordingly we find that although alkalies were useful, they did not by any means cut short the paroxysm, while the subnitrate of bismuth totally failed.

When the fit of gastrodynia commences, as it always does in the case of a young gentleman lately treated by Mr. Kirby and myself, when there is much acidity of the stomach, then magnesia affords prompt relief. Some of the particulars in this case deserve notice in a practical point of view. He is thirteen years old, extremely intelligent, tall for his age, and slender. He has been subject to gastrodynia for several years; it comes on after intermissions of various durations; but since the first attack, he has seldom been a month altogether free from paroxysms. These, when they once commence, recur frequently for a week, or even a month. He is not warned of their approach by previous constipation or heartburn, but, as was before remarked, always observes himself to be affected with acidity of the stomach at the time. The attack always invariably comes on in the evening after dinner, and sometimes awakens him at night; it is accompanied by fulness, distension, and a sense of heat in the stomach, together with a dead pain extending from the epigastrium to the back. During the fit, and for some hours after its cessation, the epigastrium feels sore and tender. The fit always lasts several hours, and terminates with eructation or vomiting of the contents of the stomach, which he has latterly been in the habit of accelerating by tickling the fauces, &c. He mentioned that some of the matter he vomited fell accidentally on a pair of blue trowsers, which it stained red.

In this case I tried prussic acid, acetate of morphia, and other narcotics, without any very notable effect either in preventing or relieving the pain. The subnitrate of bismuth did

not produce any immediate benefit, but when it was continued for a day or two, it never failed to diminish the violence of the attacks, and finally procured a complete intermission. This medicine always acted on the bowels as a mild aperient. Antacids, however, especially calcined magnesia, were more effectual than any other medicines in relieving the pain, which they generally did in less than half an hour. All articles of diet which disagree with the stomach, and promote acidity, are sure to induce an attack.

This case, in its symptoms and mode of treatment, differs then essentially from that first detailed, and seems to point out well marked acidity of the stomach as indicating antacids to be the best means of diminishing pain in such cases. Subnitrate of bismuth also exerts a beneficial influence, and probably acts by gradually checking the tendency on the part of the stomach to pour forth an acid secretion; but it is when the fit of pain is accompanied and succeeded by an increased secretion, not of an acid, sour and discoloured, but of an insipid, transparent, and watery fluid; it is in that species of gastrodynia, properly called pyrosis, that the subnitrate of bismuth is found superior to all other remedies; and, indeed, for such cases it was originally recommended.

As I have known some inconvenience to arise from ignorance of a suitable menstruum for taking this medicine in the form it is usually prescribed, viz., one part of the subnitrate to three of powdered gum arabic, it may be well to mention that the patient ought to mix this powder with a wine-glass full of warm milk, which may be allowed to stand for a quarter of an hour, and ought to be briskly stirred immediately before it is swallowed.

As I am at present speaking of gastrodynia merely as a symptom, with a view of determining what means are best suited for the removal of the pain in any particular case, I shall not enter upon the subject of the constitutional treatment by which its paroxysms may be permanently averted. With regard to

the neuralgic gastrodynia, it is important to observe, that although in the instance of this disease, which I have detailed, anodynes were not of service, yet in general they are found extremely beneficial, not merely in shortening the paroxysm, but in preventing its recurrence, of which I have seen several examples. Concerning the utility of prussic acid, morphia, and narcotic preparations in general, in diminishing the tendency to acidity of stomach, when exhibited with judgment, it is unnecessary for me to speak, it has been so ably done by Dr. Elliotson; their permament good effects in gastrodynia and dyspepsia was, I believe, first pointed out in a work published by Schluter* many years ago. The following case, communicated by Dr. Corrigan, affords a striking example of neuralgic gastrodynia thus treated:—

Sept. 1828. Rev. I. D——y, ætat. 36, rather corpulent, of temperate habits, has suffered for three years from violent attacks of gastrodynia. They last sometimes for forty-eight hours, and during their continuance the agony is described to be so great, as to make even death a desirable boon. The symptoms during an attack are, sensation of straitness in the stomach, with exquisite unintermitting pain, the pain shooting into both hypochondria, dry retching, and rejection of every kind of food and medicines; the countenance, during the attack, pale and expressive of distress. He is not able (although his sufferings make him very attentive on this point) to trace any connexion between his complaint and different kinds of food. The attacks usually seize him in bed, sometimes set in at once with great intensity, at other times commence with comparative mildness, progressively increase in intensity, and then disappear gradually in the same manner as they came on. He is rendered somewhat more liable to an attack by confinement of the bowels, and feels relieved after full evacuations; the agony suffered until these are procured is extreme, and even

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* Ueber den Magenkrampf.

then the relief comes but slowly, and always leaves an internal soreness about the epigastrium, which continues with very little diminution for weeks, and is always proportionate to the previous intensity of the pain. The average frequency of the attack is about one in every two or three months. He resides in the country, but during his present visit to town he has had one of his attacks, which gave me an opportunity of seeing him in it. It came on late in the evening, without any apparently assignable cause, the pain, as he had in his previous account of some of the fits described it, being at first slight, but steadily increasing in intensity, accompanied with great anguish, rejection of every thing from the stomach, and frequent retching; the eyes were watering, countenance pale, and expressive of great suffering. The previous history leading me to view the disease as arising from morbid sensibility of the nerves of the stomach, I had determined, should an opportunity offer while the patient was under my immediate observation, to exhibit opium. I should, perhaps, have observed, that all the preceding attacks had been treated in the country by bleeding or leeching, purgative medicines, and enemata. I gave him fifteen drops of tra opii in half a glass of tepid water, without an admixture of any of the stimulants or aromatics, as ether, fœtid tincture, &c., which are frequently, but, I believe, injudiciously in many cases added to opium, under the supposition of increasing its virtues. In a few minutes after taking the draught, the stomach became settled, the pain was checked in its progressing intensity, and soon after began to die away, leaving behind it a very trifling soreness, which had nearly quite disappeared on the following morning. This was the first occasion on which he had passed through an attack in this manner.

From the date of the above observations, September, 1828, to July, 1831, I had frequent opportunities of seeing this gentleman, and he never, during that space of time, experienced any symptom of relapse. Since July, 1831, I have not seen

him, but I may be almost certain, from his silence, that he has continued to enjoy the same immunity up to the present May, 1832.

Concerning alkalies I may remark, that the liquor potassæ causticus, although not so well suited to be used as a domestic medicine, is much preferable to magnesia in relieving acidity and heartburn.

ART. XX.—*On the Iodide of Platinum and its Saline Combinations.* By ROBERT J. KANE, M.R.I.A., Professor of Chemistry to Apothecaries' Hall, &c. &c.

THE salts into which the per-chloride of platinum enters as the electro-negative element, being the best known and some of the best marked of the chlorine series, I was desirous to form the corresponding combinations of the iodine class, but was astonished to find that although we have been so long acquainted with the different combinations of chlorine and platinum, we had not hitherto made any advances towards a knowledge of the combinations of that metal with iodine.

But three systematic writers mention the name of iodide of platinum. Gmelin* merely says, "Iodic acid produces with muriate of platina a yellow precipitate, slightly soluble in water." Thompson† uses nearly the same words. Berzelius‡ enters more fully into the subject, and states some experiments made by Lassaigne, for whose original paper we have sought through most of the Continental and British periodicals as far back as 1824 without being able to meet with it. We are,

* Handbuch der Theoretischen Chemie. Erste band. Zweite Abtheilung, Seite 1412.

† Chemistry of the Inorganic Bodies, vol. i. p. 664.

‡ Traite de Chimie, tom. iv. p. 443.

therefore, restricted to the summary of Lassaigne's researches given by Berzelius; and in order to state fully what that well known chemist had observed, we shall transcribe the article entire.

"This salt (the iodide of platinum)," says Berzelius, "is of a deep colour, and scarcely soluble in water. Lassaigne mixed a dilute solution of per-chloride of platinum with a solution of iodide of potassium; the liquor became deep brown, and deposited by the action of heat a black insoluble powder, which is the iodide of platinum. This salt easily abandons its iodine; it gives it out by boiling with water; the proto-iodide formed in this case has not as yet been examined.

"The colour of the iodide of platinum is so deep, that a solution containing but $\frac{1}{40000}$ of platinum becomes at the end of fifteen minutes wine red on the addition of iodide of potassium. It is not yet known whether the iodide of platinum forms double salts."

This is the entire article on this substance inserted in that truly valuable work. But both these phenomena had been observed by Silliman in America, who proposed hydriodic acid as a test for platinum from the depth of the colour it produces, and noticed the deposition of the black powder, but mistook it for metallic platinum.*

The whole of our knowledge of the iodide of platinum, therefore, consisted in the following facts: When solutions of per-chloride of platinum and iodide of potassium are mixed together, a brown or deep wine red colour is produced, and a black powder thrown down, which is easily decomposed, and which contains iodine and platinum.

In repeating Lassaigne's experiment, I soon found that a number of circumstances influenced the result. It is, therefore, necessary to describe the modifications of it.

When a dilute solution of per-chloride of platinum is mixed

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* Quarterly Journal of Science, New Series, vol. xvi. p. 166.

with an excess of solution of ioduret of potassium, the liquor assumes a fine claret colour, but no other change is produced. If we use more concentrated solutions, taking care still to have the ioduret of potassium in excess, the colour of the liquor becomes magnificent and intense claret, and a quantity of the chloro-platinate of potassium makes its appearance generally discoloured by admixture with a small quantity of a dark powder. If we use alcoholic solutions, even though dilute, the chloro-platinate is deposited in consequence of its insolubility in that medium.

In none of these trials has the black precipitate made its appearance; but if in place of adding the ioduret of potassium in excess we use more per-chloride of platinum, a copious black precipitate is produced, which depositing itself on the smooth inside surface of the glass vessel, has a perfect and brilliant metallic lustre. The supernatant liquor has not the fine red colour of the former instances, it merely possesses the brownish yellow of the chloride of platinum that remains undecomposed.

The black precipitate consists of the iodide of platinum mixed with a considerable quantity of the scarcely soluble chloro-platinate of potassium.

In these different circumstances of decomposition, there is no iodine liberated; where the liquor is claret-coloured, iodine exists in combination; but when the liquor becomes brownish yellow, no iodine whatsoever exists, but chlorine is found free in considerable quantity.

If to the liquor containing the black powder diffused through it we add more ioduret of potassium, the black powder disappears, and the solution becomes splendid red. The chloro-platinate of potassium remains undissolved.

It is thus evident, that to prepare the black powder, we must observe the following precautions: first, to use an excess of per-chloride of platinum; and second, to wash the precipitate exceedingly well with warm water to dissolve out the chloro-plati-

nate of potassium, which, on account of its trifling solubility, is exceedingly difficult to remove. It is, in fact, almost impossible to do so completely by washing. The mode I have latterly adopted is, to take the moist precipitate and put it into a large quantity of water, which is kept at 200°, until it dissolves out the impurity. The water often requires to be renewed before you take away the whole. I was at first fearful of decomposing the iodide by such a temperature, but I have found that it can support that heat for a long time without losing any iodine.

With these precautions, I obtained a quantity of the iodide for examination.

When cautiously dried, it is of a dull black colour, rather heavy, insoluble in water, either cold or warm. I did not find it so easy of decomposition as was stated by Lassaigne ; a quantity of it put into water did not yield any trace of iodine until the water had been boiling for a long time, and even then the quantity decomposed was almost inappreciable.

Alcohol and ether appear to be destitute of any action on it.

When heated to about 250° Fah. it began to give out iodine copiously, and was totally decomposed before attaining a dull red heat. The residue was metallic platinum.

It was not acted on by sulphuric, nitric, or muriatic acid in the cold. Nitro-muriatic acid soon dissolved it, per-chloride of platinum being formed, and iodine separated.

It dissolved in a solution of potassa. The liquor was yellow. The excess of alkali having been neutralized by nitric acid, the whole assumed a wine red colour ; and on the addition of more acid became again decolorized, and a black precipitate fell, which by alcohol was separated into iodine and metallic platinum. These substances existed in the precipitate merely mechanically mixed.

A solution of ioduret of potassium in water dissolved it easily, and in large quantity ; the solution was of a magnificent claret colour, so deep as to be opaque, when the solution was pretty strong.

When added to an aqueous solution of ioduret of hydrogen, it also dissolved with facility. The solution was of a deep claret, similar to the colour of the solution in ioduret of potassium.

Water of ammonia having been poured on the iodide of platinum, the powder became first greenish, then brown, and finally, a fine clear Indian red. The supernatant liquor was yellow, contained much excess of ammonia, and when boiled for some time, deposited some of the red substance in exceedingly minute crystals.

To determine the composition of this iodide, I proceeded as follows:—

100 grains of the iodide of platinum were heated to redness until all traces of iodine disappeared; the remaining platinum weighed 35 grains.

100 grains therefore contained—

Iodine	65.0
Platinum	35.0

In a second analysis performed in the same way, 33.75 grains were composed of—

Iodine	22.0
Platinum	11.75

But if we calculate the atomic relations of iodine and platinum, we shall find that in a compound of one and a half atoms of iodine, and one atom of platinum, the composition would be in 100 grains—

Iodine	66.3
Platinum	33.7

But this approaches so closely to the results obtained in the two analyses related above, as to render it nearly certain that the iodide which we have described is so composed; and this is further corroborated by the changes which take place by the

reaction of the per-chloride of platinum on the ioduret of potassium, the disengagement of chlorine shewing that the iodide contains less of the electro-negative element than the per-chloride, *i. e.* less than two atoms.

The iodide is therefore composed of—

$1\frac{1}{2}$	Atoms of iodine (126 + 63) . .	189
1	Atom of platinum	96
	Its atomic weight	285
	And its formula	$1\frac{1}{2}$ I + Pl.

The sesqui-iodide of platinum unites with the iodine bases, and forms salts to which the generic term of iodo-platinates may be applied. I have as yet formed but a few of these, the principal properties of which I shall now proceed to describe.

IODO-PLATINATE OF POTASSIUM.

This salt is easily formed. If we add an excess of a solution of ioduret of potassium to a solution of per-chloride of platinum, a claret-coloured liquor results, which owes its tinge to the formation of this salt, the iodide of platinum not communicating any colour to water. By adding sesqui-iodide of platinum to a solution of ioduret of potassium as long as it is taken up, we obtain also a solution of this salt, which is so deeply coloured as to be perfectly opaque.

In either of these ways, it is not very easy to avoid an excess of ioduret of potassium. The following mode affords a salt determinate in its composition, although mixed with foreign matters :—

Take some ioduret of potassium in fine powder, and add to it a strong solution of per-chloride of platinum, taking care to preserve an excess of the ioduret. Considerable effervescence takes place. A quantity of ether is to be immediately poured on the mass, and the whole to be agitated for a few minutes.

A black powder will be found to have collected, which is to be separated from the ethereal solution by the filter; it is the iodo-platinate of potassium, rendered impure by a small quantity of chloride of potassium.

To obtain the same body by direct combination, the solution of ioduret of potassium must be digested for some time on a considerable quantity of the iodide of potassium, much more than it can dissolve. The reason of this is, that it has a tendency to form a different salt, which contains more ioduret of potassium than that which occupies us at present.

The pure iodo-platinate of potassium is very soluble in water; its solution may be evaporated in the open air without alteration. The solution is of a magnificent claret colour. By cautious evaporation, the salt may be obtained in soft crystalline masses, but so imperfectly, as not to allow of my determining the form of the crystal with precision. When prepared by precitation by ether, it is not crystalline, but appears as a dull black powder, very similar to the iodide of platinum in external appearance.

It is soluble in alcohol, but is totally insoluble in ether. If ether free from water be added to a very strong solution of the salt, the water is removed, and the salt deposited as a black powder. Ether, when agitated for a long time with a more dilute solution, does not assume any colour, or take up any portion of it.

A solution of potash acts on this salt nearly in the same way as on the iodide of platinum, as before described.

When exposed to heat, the iodo-platinate of potassium is decomposed; it gives out iodine, and the ioduret of potassium mixed with metallic platinum remains.

On this principle was founded the mode of the analysis.

Twenty grains of pure salt were heated carefully until all the iodine had been expelled, and a mass of metallic platinum and fused ioduret of potassium remained. This was boiled in water, and the platinum undissolved weighed 4.75 grains.

The solution of ioduret of potassium was carefully evaporated, and the dried mass (the salt having been prepared by the direct combination of its constituents) weighed, was found = 7.75 grains.

The difference between the sum of the weights of the platinum and ioduret of potassium (4.75 + 7.75) 12.5, and the weight of material used 20 grains, was the weight of the iodine, which therefore = 7.5 grains.

The 20 grains were composed of—

Iodine	7.5
Platinum	4.75
Ioduret of potassium	7.75

Or,—

Iodide of platinum	12.25
Ioduret of potassium	7.75

But 7.5 iodine to 4.75 platinum is very nearly in the ratio of $1\frac{1}{2}$ atom of iodine to 1 atom of platinum, thus proving the accuracy of the previous analyses; and the salt is apparently a combination of the iodide of platinum, and the ioduret of potassium united atom to atom; for on that supposition 20 grains would consist of—

Sesqui-iodide of platinum	12.64
Ioduret of potassium	7.36

But we obtained by experiment, as above, numbers so close to these as to leave no doubt as to the nature of the salt. It is, therefore, a neutral iodo-platinate of potassium. Its formula $(1\frac{1}{2}\ I + Pl) + (I + Pl)$, and its atomic weight = 471.

IODO-PLATINATE OF HYDROGEN.

I before mentioned that the iodide of platinum dissolved readily in the solution of ioduret of hydrogen (hydriodic acid)

in water. This proves the existence of a compound, the properties of which I have only partly developed.

To a strong solution of ioduret of hydrogen, the iodide of platinum was added as long as it dissolved. The solution was fine claret colour, like that of the iodo-platinate of potassium, and so intense as to render the liquor opaque. It reddened litmus paper strongly.

When evaporated considerably, it began to give out ioduret of hydrogen, and after some time, iodide of platinum began to separate. By cautious evaporation, however, I succeeded in obtaining small grains, which were soluble in water, the solution being claret coloured, and which, when heated, gave out iodine, and left metallic platinum only.

From the facility with which this salt is decomposed, I was not able to determine with accuracy its composition. In order to obtain a more tangible salt, I attempted to replace its hydrogen by a metal, and was led thus to the examination of the following body:—

IODO-PLATINATE OF AMMONIUM.

In order to effect the analysis of the iodo-platinate of hydrogen, I added water of ammonia to the solution of that salt, to replace the hydrogen by ammonium. On the addition of the ammonia, the claret-colour disappeared; a black powder was deposited, which, after a few seconds, passed through various shades of brown, and finally, became fine clear Indian red.

We before noticed, that by the direct action of the water of ammonia on iodide of platinum, the same red powder was produced.

The solution contains much ioduret of ammonium.

When this red powder is heated, it gives out a large quantity of iodine, then a very small quantity of white ioduret of ammonium sublimes, and metallic platinum remains behind.

When mixed with lime and heated, it yields ammonia.

This substance is evidently a combination of iodide of platinum and ioduret of ammonium. Its analysis was effected in the follow manner:—

Fourteen grains were heated to redness, and the volatile ingredients having been driven off, there remained 4.3 grains of metallic platinum.

Now, to form the sesqui-iodide of platinum, 4.3 of the metal unite to 8.4 grains of iodine. Therefore, the 14 grains of the red powder contained 12.7 iodide of platinum, and there remained only 1.3 grains of ioduret of ammonium.

But as $12.7 : 1.3 :: 1425\ (= 285 \times 5) : 145.7$, a number approximating so closely to 144 as to render it very probable that the composition of this iodo-platinate of ammonium is—

5 Atoms of iodide of platinum (285×5) .	1425
1 Atom of ioduret of ammonium . . .	144
Its atomic weight is therefore	1569
And its formula .	$5\,(1\tfrac{1}{2}I+Pl)+(I+NH^4)$

There are some other iodo-platinates of which I have not finished the investigation, and also a substance which I believe is an iodide, containing less iodine than that which we have just now described, the properties of which I hope to be able to communicate after some time.

Art. XXI.—*Account of a remarkable Case of Pneumothorax.* By James Houghton, M. D., Licentiate of the King and Queen's College of Physicians, Physician to the South Eastern General Dispensary, &c.

The difference of capacity for resisting the action of disease is as great in different individuals as their various external forms, and must strike every medical observer. Pneumonia in one

person may proceed to complete hepatization of one lung and involve a great part of the other, and yet be subdued by the judicious employment of art; while in another, it may not pass beyond the first stage in one of the lungs before the patient sinks: in fever, one sees every day in hospital practice patients in whom the three cavities have been profoundly engaged escape, and others carried off who have presented little disturbance of function during life, and little trace of organic lesion after death in any of the viscera. Some constitutions are affected more severely by diseased action in some one organ, the same amount of which in another individual of a different temperament produces comparatively trifling effect; and it appears to form a branch of pathological research which might with advantage be more cultivated, to mark varieties of temperament, as they are most likely to resist or succumb to particular diseases.

There are some lesions, however, of so grave a character, that peculiarity of constitution is esteemed to avail nothing against them; they progress with greater or less rapidity to the death of the patient, which is the only relief for the anguish that usually attends them without remission till it arrives. Perforation of the intestines, with extravasation of their contents, into the peritoneal cavity, and pneumothorax, with a fistulous communication between the cavity of the pleura and the bronchial tubes, are lesions of this kind, analogous in their nature, and resembling one another, in generally being rapidly fatal in their result.

A case of the latter disease which has been under my observation for some months, has taken so remarkable a course, that I am induced to record it as a singular instance of how great a struggle nature can make even against the most profound and extensive organic lesions.

M. I., ætat. 28, a bricklayer, dark hair, blue eyes, and well proportioned, was seen by me for the first time on the 12th February, this year. I found him propped in the sitting posture by a feather-bed placed behind him, breathing with diffi-

culty and anxiety, and often seized with a peculiar dry ringing, or rather husky, cough, brought on by attempts at speaking, which he was unable to do for more than a minute together without great distress; he was much wasted in flesh, his cheeks were hollow, and having those livid marks under the eyes which bespeak advanced pulmonary disease. The following is the most accurate account of his complaint previous to my seeing him, that I could draw from him:—

He had enjoyed good health previous to 1831, when he got a wetting, which produced rigors, followed by nausea, loss of appetite, and headach, and in about two months by cough, which was dry at first, but soon accompanied by expectoration, occasional shiverings, and night-sweats. He now became very weak, and lost flesh rapidly. Although not compelled to continue his labour by indigence, he would not *give in*, his vivacious active temperament made him persist in working, even when in a very feeble state with daily shiverings and copious night-sweats. He took a voyage to Liverpool and back, to seek in sea-sickness a remedy for his loss of appetite, which he considered his worst symptom. About the end of July he was suddenly seized with an acute pain in the centre of the scapular region, without any sudden invasion of dyspnœa. He relieved it so effectually by warm fomentations, that it did not confine him a day to the house. On the 2nd December, being persuaded to go to the theatre after work, he was exhausted there by heat and fatigue, a heavy chill came on, and a sharp pain of the same character as before, seized him about the seventh rib of the left side, laterally, together with increased rigor and vomiting. These were so far subdued after a couple of days, as not to compel him to cease from working. On the 26th of December, however, he was again seized with such a severe pain at the bottom of the left side of the thorax, that he became unable to leave his bed, where he was obliged to be supported in the sitting posture, the acuteness of the pain preventing him from lying down; his breathing became more

affected this attack than any preceding, and greater weakness and cough supervened, with viscid expectoration. At the end of January he made another attempt to go out, but was obliged to take to bed again with an exacerbation of the pain and the other symptoms.

Such was the imperfect history that I could procure of his malady before my first examination of him on the 13th February.

Some of his general symptoms are already mentioned. He had not slept for many nights from the orthopnea and pain. The night-sweats were by no means so considerable since his last severe attack, but almost simultaneously with their diminution, he became affected with diarrhœa, which still continued, with total anorexy. He had now also thirst, and some soreness of the epigastrium, with hot skin. If I add to these that he had very scanty dark-coloured urine for two months, and slight œdema of the feet, I will have omitted none of his symptoms, and proceed to detail the results of auscultation, percussion, &c.

The thorax in general sounded well on percussion, but in the anterior and lateral parts of the left side the sound was decidedly clearer than the right. There were two places where considerable dulness contrasted much with the other parts, viz. on the left side, posteriorly between the angles of the ribs and the spinal column, and anteriorly on the right side about the area of the palm of the hand, just above the mamma.*

The respiration was totally inaudible over the left side of the chest in every part except in the portion along the spine

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* Doubtless, could I have percussed him in the erect position, or sitting, I should have then discovered (as I afterwards did when he was able to get out of bed) that a space of three inches in depth all round the bottom of the left side of the thorax was perfectly dull, and terminating upwards abruptly in the clear sounding portion ; but from the nature of his bed, I could only examine him satisfactorily in the horizontal position, in which way the fluid of course gravitated from the surface.

corresponding to the dullness on percussion, where a faint and peculiar brochial respiration* was perceptible, and also doubtfully under the left clavicle.

In the right lung, the respiration was loudly puerile throughout, but in the dull part above the mamma, mixed with a muco-crepitating rale. The respiration was loudest just round the place which furnished this rale, and mixed with a shade of bronchial respiration.

On examining the voice, there was heard, on attentive listening, all over the left side, immediately after speaking, a metallic resonance, like tinnitus aurium, and at intervals the tinkling drop.† The tinkling, resonance, and drop were heard this day on speaking and coughing, but not till afterwards, on inspiration. The heart was seen and felt pulsating in the epigastrium, and at the right side of the ensiform cartilage, between the cartilages of the ribs on the right side; its action was heard all over the right side of the chest; pulse 100.

On measuring the two sides of the thorax, the tape carried round the left was found about one inch longer than that round the right side. The left intercostal spaces were sensibly dilated, and the ribs less raised in inspiration than the right.

This is the sum of the first day's notes I took of his case, which every medical man of the present day will recognize to be amply sufficient for making the diagnosis of pneumothorax of the left side, and tubercular development at the superior part

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* This was so faint, that I was in the early examinations inclined to suppose that it was a slight murmur conveyed across the spine from the loud respiration of the other lung; but future observation undeceived me in this.

† This is the same phenomenon which in a graver tone (coming through a larger fistula) is called bourdonnement amphorique; but in this case it could at no time be properly called a *humming*, but rather resembled the ringing cho of one's own cough or sneeze in an empty room. The drop is very well represented by touching lightly an alabaster vase of some size with a quill held loosely in the fingers.

of the right lung. It was further observation which led me to discover the fluid also contained in the left pleura, and convinced me of the fistulous origin of the air.

I of course regarded the case as one that must speedily terminate fatally, and conceived only the idea of palliating some of worst symptoms, such as the sleepless dyspnœa; but turning my attention at first to the gastric symptoms, I ordered him some chalk mixture and tincture of opium, and a blister over the right mamma.

The next day the diarrhœa was somewhat checked, but the abdominal tenderness, thirst, and anorexy were not relieved. He had been given a great quantity of purgative medicine by a practitioner who saw him before me, to which he attributed the purging.

On the 15th February he had six leeches applied to the epigastrium, which bled profusely, and served him much; he got sleep that night, and the thirst and redness of tongue were diminished; diarrhœa, however, still continued; a blister applied below the umbilicus removed the abdominal tenderness, and he expressed great relief from sleep procured by an anodyne draught.

18th Feb. The anodyne had continued to procure him sleep, the diarrhœa was stopped, the tongue was not so red, and he was able to eat a little jelly of carageen moss; his urine had become scantier than usual, since the last blister; this was removed by a diuretic mixture of camphor mixture, acetate of potash, tincture of digitalis, &c. I need not insert the daily notes of the stethoscopic phenomena, which were chiefly repetitions, but remark that the tintement was heard very plainly every day on coughing and speaking, and now, even on inspiration, if it was listened to with close attention; this could not take place without fistulous opening into the bronchial tubes.

20th Feb. Since the removal of the gastric symptoms, and their concomitant fever, his strength is somewhat recruited, the dyspnœa is much diminished, and he gets some hours' re-

freshing sleep at night now from the anodyne draughts of acetate of opium. I recommended him to sit up for some hours, and on examining him sitting in a chair, discovered the dullness caused by the fluid inferiorly; on making him shake himself by rotating the trunk with a jerk on the spine, the noise of the fluid was heard as plain as the splashing of a churn, if the ear was applied to the chest, and audible even to a bystander. Although I conjectured that there must have been fluid, I did not demonstrate it till this his first day of sitting up, for although so plain as I above described, I did not succeed in producing the sound of it by the ordinary way of succussion by the shoulders in bed; it was inconvenient, for the same reason, that the dulness or percussion was not discovered; and I should think that where the strength of the patient will admit of it, succussion is much more effectively done by the patient making a rapid jerking twist of his spine while the ear is applied to the chest than by the usual Hippocratic method of striking the shoulders.

He had been kept on carageen jelly, rice milk, arrow root, &c.; but he took a disgust to this diet; and about this time he asked to be allowed a small quantity of meat. As I considered it of little importance as to the result, what diet or treatment he was kept under, I assented to his gratifying himself in this; but in a couple of days afterwards on my visit, I found him very heavy and chilly, his tongue loaded, pulse 120. This was caused, it appeared, on inquiry as to his diet, by his having eaten half a pound of sausages the evening before, to give, he said, his bread and tea a relish. This gastric attack and one similar brought on about ten days after by another error in diet, were set aside by a little abstinence and medicine. In the mean time, the muco-crepitus in right lung remained, and was noted as increasing and becoming gargouillement, whilst the loud bronchophony took the character of pectoriloquy.

The note of 3rd March relates that he has not lost ground since. He now sits up the whole day, the crepitus, bronchial,

respiration, and bronchophony persistent over the middle anterior third of right lung. His bowels are become costive since the diarrhœa ceased, pulse 110, tongue white, his legs are painful, they become œdematous during the day, and subside by the rest of the night. Some vesicles are formed on the foot. Some laxative medicine operated well, and removed the gastric irritation, and the vesicles disappeared.

Some days after, a pain* of a very acute nature seized him in sudden sharp stings, and after a couple of days, was removed. The tintement was becoming somewhat plainer on speech, cough, and inspiration, so as to give reason to suppose that the fistula was enlarging; little difference, however, was observed in it from day to day, and it was more important to watch the progress of the disease in the right lung. This appeared stationary. About the 10th March he recommenced a full meat diet, which he has continued since, with even occasionally a glass of punch. He did not suffer any inconvenience from this regimen except when he committed some excess or error, (as, for instance, one day in Lent that he eat salted herrings for dinner), and he evidently gained in muscular strength.

23rd March. His strength continues to improve; he sleeps at night now without the anodyne; the results of auscultation the same; cough and dyspnœa diminished, œdema of foot gone, pulse habitually 92, he begins to speak of going out again.

Being obliged to leave Dublin for a short time, I did not see him for upwards of a fortnight. On my next visit, 15th April, I found that he had been walking out every day, sometimes for four hours together, and that his general symptoms

* Sharp pains in various parts of the body, but particularly about the lumbar mass of muscles, are very common in phthisical patients; they are in some way connected with a low hectic state, and I think might be properly called hectic rheumatism. A good local remedy for them is a liniment made of extract of belladonna and compound camphor liniment in the proportion of a drachm to two ounces.

were not aggravated by this exercise; his face was much improved in aspect, and his strength increased. He had procured a strong belt to wear round the loins, which supported his back, and enabled him to take more exercise with less dyspnœa. His breathing, however, became more laborious when he walked quickly, and the rheumatic pains about the sacrum returned since he began to take exercise out of doors.

He visits me now twice a-week, and continues to improve, or at least not to lose ground, although the same undeniable evidence of tubercle in the right lung continues. The space over which the rale and dullness are perceived, is, however, not so great; and I am strongly inclined to think that an attempt at a cure has been making in the right lung by the removal of the tubercles; and certainly in the left side nature has set up the process by which the cure of pleuritic effusions is sometimes accomplished. On one of my last examinations of him, assisted by my friend Mr. Houston, I wished to shew him the dilatation of the left side, which, on my former measurement (four months ago) existed to the amount of an inch, but, to my great surprise, on bringing the tape round the chest, we found that the left side was *now* three quarters of an inch less than the right; and we now observed that the ribs on the left were evidently flatter than on the other side. The metallic resonance is not heard now on inspiration as formerly, and not so plainly on speaking and coughing. The drop persists as plain as ever. I conclude from this that the fistula is diminishing in size. The respiration is heard now more plainly at the root of the lung, and anteriorly under the clavicle, and one single bubble is faintly distinguished in this situation. Here is probably an adhesion and the remains of a small cavity. As to the fluid, I think it has somewhat increased, as the dullness seems a little higher than formerly; but this should happen as the left side is contracting, and more particularly if it be true that the lung be re-expanding. He hears the fluid rattling in his chest as he goes down stairs, or makes a smart step. The heart is decid-

edly less pushed to the right side than when I saw him first. I may conclude the account of this extraordinary case by mentioning, that he has resumed his labour nearly a month, and is now employed from six in the morning till the same hour in the evening in building a chapel in Westland-row.

That the pneumothorax, with empyema, owes its origin in this case to a fistulous opening into the pleura by the bursting of softened tubercle, there can scarcely be a doubt. Besides, the physical signs which prove it almost to a demonstration,* the history of his disease previous to the first indication of any affection of the pleura, is that of one labouring under phthisis, viz., his cough, expectoration, debility, night-sweats, &c. Indeed, since the advancement of pathology by more accurate observation and improved means of research, the occurrence of pneumothorax in any other manner than by communication being opened between the bronchial tubes and the pleura, is in my opinion to be fairly called in question. Dr. Townsend informs me that he has seen twenty-three cases of pneumothorax, eighteen of which he was concerned in the dissection of; and that in all these there was fistulous opening by the bursting of tubercles.

I have not been able satisfactorily to determine the period at which the pneumothorax first took place, although I have questioned him frequently, with a view to investigate this point. It might be referred to any of the three periods at which he became seized with severe pleuritic pain, the end of July, the 2nd or the 26th of December; but on none of those occasions was

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* Laennec, in his more matured experience, asserted that the tintement metallique being heard on speaking, coughing, and respiration, was sufficient to decide the existence of a fistulous communication. Ces signes suffiraient aujourd' hui pour affirmer avec une pleine certitude, &c.—(Traité de l'Auscultation mediate, tome ii., p. 288.) And however it might be conceived that speaking or coughing could produce the metallic resonance in one side of the chest filled with air without a fistula, I hold it impossible that respiration could produce any sound in the cavity of the pleura without communication with the bronchi.

the pain accompanied by any sudden or overwhelming dyspnœa,* which corresponds with the two cases related by Dr. Townsend.† As to the operation for empyema, I consider that where pneumothorax exists (there being a fistula produced in almost every case by softened tubercles) it only hastens the death of the patient; in the present case, the presence of tubercles in the other lung prevented me from entertaining it for a moment. I am aware that cases are on record‡ where, on injecting the sac of an empyema, the fluid used is said to have passed through the trachea and out of the mouth, in which case there must have been fistulous opening from the bronchial tubes; but those cases occurred before the accurate research was applied to these subjects|| which has improved our knowledge of them so much in late years.

This interesting case furnishes the most surprising instance of resistance to extensive organic destruction and profound morbid action that I am aware of, and I believe that none similar is on record. Laennec, the first who discovered this lesion on the living body, says, "Je ne l'a jamaîs observé chez aucun malade qui ne fût alité."§ And Louis, who relates seven cases of it, states, that death occurred at intervals after the perforation of from sixteen hours to thirty-six days, and mentions, that no circumstance that he could determine, such as difference of strength or constitution in the patient, or greater or smaller size of the tubercular cavities, could satisfactorily account for the longer or

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* In July, although the pain was not suddenly followed by dyspnœa, yet he observed that he had after that to make, as he said, a *double draw*. It is more than probable that the fistula is to be referred to this period.

† Transactions of the Association of the College of Physicians, vol. v.

‡ Journal Generale de Medicine, Dec. 1813.

|| Which makes me doubt their authority. Dr. Townsend tells me that he has investigated many of these pretended cases, and impugned their accuracy in his article on "Empyema" in the July number of the Cyclopædia of Practical Medicine.

§ Traité de l'Auscultation Mediate, tome ii. p. 262.

shorter duration of life after the occurrence of pneumothorax.* The cases that have occurred in this city have had a more chronic course than those observed by the French writers; but they have all been marked by a progressive march from bad to worse, and terminated fatally sooner or later. When we consider these accounts, the individual M. I., with one lung compressed by air and fluid, and its function destroyed, the other the seat of tubercular deposition, and his heart displaced, presents a curious object of contemplation, as he goes about his daily work as cheerily as those around him.†

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* Recherches Anatomico-pathologiques sur la Pthisíe, p. 487.

† During my search after cases of a similar nature to that of M. I., several of a singular character have come across me, but not one of the same kind as his. A young lady in this city had a fistulous opening in her side after the operation for empyema, for four years, which discharged pus constantly. But the most remarkable case of this sort which has come to my knowledge is one recorded by Dr. C. Otto in the Transactions of the Royal Medical Society of Copenhagen, with which I was favoured by Dr. Graves. Except in the efforts of nature in resisting disease, it bears no analogy with the case of M. I.; but it is so singular in some respects, that it was suggested to me that an abstract of it appended to this paper would be acceptable.

H., ætat. 34, was affected with typhus, with peripneumony, after which a vomica was formed in the chest, indicated by purulent cough, obtuse pain, and hectic symptoms. By degrees a tumour formed between the fourth and fifth ribs of the left side. It became fluctuating, and being opened, an enormous quantity of pus flowed out, and a large cicatrix remained after the incision. After a little, another tumour pointed between the seventh and eighth ribs of the same side, which was also opened, and discharged a great quantity of pus. All the symptoms were ameliorated, but the last incision remained open, and pus continued to flow from it, so that it was converted after a while into a perfect fistula. The patient proposed to his medical attendant to stop the fistula with a bougie (cereolus) adapted to its size, and to open it at stated times to allow the flow of the matter. This was proposed for the sake of cleanliness, and a flexible bougie of gum elastic was fitted to the fistula and withdrawn every two hours daily, at which intervals the accumulated pus was drawn off. Finding that this answered well, he persisted in it, extracted the bougie twice a day, and took away about half a dish full (dimidiam pateram) of pus. This evacuation continued for fifteen years, and did not affect the patient. At first he had a cough, with muco-purulent expectoration, which, after two years, de-

No one will understand me, however, as recording his case as an instance of recovery. On the contrary, I am much inclined to fear that the same element of his constitution, which has enabled him to make so unprecedented a rally, the nervous vigour of his system, is exposing him to circumstances the most unfavourable

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creased. He remained lean and pale, but enjoyed his appetite and sleep; his bowels were regular, he was cheerful in disposition, and of a quick understanding; he continued to partake in the pleasures of social life. If, which rarely happened, no matter flowed when the bougie was extracted, he had invariably the same evening rigors, followed by heat and sweating; the next day, when the bougie was drawn, the pus was evacuated, and the patient enjoyed his usual health. He concluded that there was no more matter to be evacuated when air-bubbles appeared at the fistulous opening, as it seemed, because the atmospheric air rushed in to fill the space evacuated by the pus. After fifteen years of this daily practice of drawing off the matter, Dr. Otto was one evening sent for, and found him apoplectic. His wife told him that on the withdrawing of the bougie that day, no pus had flowed, and that the patient had been expecting with the greatest tranquillity the febrile access, which always came on when the pus was absent, and which used to reproduce the flowing of the matter; that he became more and more languid, and at length fell down insensible. Bleeding and cold to the head brought back his consciousness, but a cough, with fœtid sanious expectoration, arose. After three days' treatment by laxatives and poultices to the side, &c., a little sanious fœtid matter flowed from the fistula, upon which his symptoms were much relieved. Feverish symptoms, cough, and fœtid expectoration, however, remained, and it was found that his right arm was paralytic. The latter symptom decreased, but other symptoms continued, which led them to judge that he would soon die phthisical. A large quantity of fœtid pus flowed from the fistula similar to that expectorated, without relief of the symptoms.

Dr. Herbold was called to consultation, who advised the immediate setting aside of the bougie, from a theory he had formed as to the matter pressing on the lungs, and the atmospheric air irritating the sac of the abscess. A metallic plate perforated with a hole, over which was laid a thin membrane, was substituted for the bougie, and kept on by adhesive plaster. The matter was eliminated by a small hole made in the membrane, and during expectoration the matter had a free exit without fresh atmospheric air being admitted through the fistula.

Under this contrivance he improved, the fœtid odour of the pus disappeared, and the fever and cough decreased. The metallic plate and the membrane were, however, found not to answer, and were replaced by a gum plaster furnished with a hole, which allowed the matter free egress. He became again convalescent,

for promoting the curative efforts which nature has been carrying on, for his passion for activity is so great, that no remonstrance of mine will persuade him to forego, even for a time, his labour, during which he is frequently exposed to heat, cold, and fatigue.

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and an hæmoptysis, which arose shortly after, was set aside by appropriate treatment. It is worth mentioning, that this hæmoptysis took on a recurrent type, and appeared like the menses every month. The side was much contracted, and the shoulder fallen.

After a time the matter again stopped, and he was seized with acute symptoms, fœtid expectoration, and severe cough, and in a short time a sudden hæmoptysis, with a copious discharge of blood from the fistula, came on, which, after some time, changed into the usual whitish pus; but the latter, after a while, again ceased, and this time without any severe effects upon the patient. He got better, and thought he was about to be perfectly cured as he became free of the disagreeable uncleanliness from the flowing matter.

After making a rally against two recurrences of the acute attacks, by which, however, he was evidently much worsted, he at length sunk, having suffered dreadful agonies before his death.

The dissection was made on the following day.

The abdominal organs were all sound. The large intestine vascular. The right lung was large in its inferior part; signs of hepatization were observed. The canal of the fistula was directed upwards between the fifth and sixth ribs, and arrived at the cavity, which filled the space between first rib and the diaphragm. In the superior part of the cavity was observed a bougie of linen, convoluted and entire. There was neither pus nor blood in the cavity, the parietes of it were moist and very fœtid. The sac was formed external to the lungs, and the lung of this side was nearly entirely deficient, only a small semi-cartilaginous mass, which did not fill the fourth part of the sac, was found at the posterior mediastinum, and did not appear to be adapted for respiration. The aorta and the other organs of the chest were sound. The first wound, which was made seventeen years before, and of which the cicatrix remained, had entered the superior part of the sac, while the second, from which the fistula followed, was at the inferior part.

The bougie had slipped into the cavity thirteen years before, and the patient, believing that he had observed fragments of it come away for a time afterwards, was quite sure that the whole thing had passed off; but it remained for that space without being acted on chemically by the pus.—*Acta Regiæ Societatis Medicæ Havniensis*, tom. vii.

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Les Lois de la Revulsion étudiées sous la rapport Physiologique et Therapeutique, par J. C. Sabatier (d'Orleans). Memoire Courronné par la Société Medico-pratique de Paris, 1832, pp. 148. *The Laws of Revulsion studied under their Physiological and Pathological Relations.* By J. C. SABATIER (of Orleans), Prize Essay of the Society of Practical Medicine of Paris, 1832, pp. 148.

THERE are few subjects which have been so much neglected as the study of the varied and most important phenomena of revulsiòn. While the greatest discoveries were making in diagnosis, pathological anatomy, and the action of medicines, revulsion and its numerous applications were until lately a nearly unexplored portion of the field of medicine. The doctrines of Broussais, however, by which diseases were referred to a plus or minus degree of local vitality, and therapeutic agents, to stimulants or sedatives, necessarily involved the application of the laws of revulsion ; and it is to him that we owe much, if not all, of our knowledge on this subject. It may be said, indeed, that the above doctrines were those of Brown, and that we should attribute our information on revulsion to him ; but although the general expression of the doctrines of these celebrated men is the same, yet in one respect, which forms the character of the doctrines of Broussais, they are widely different. Brown divides diseases into those of sthenia and asthenia; but these with him are general terms, applying to the body or system at large. He did not conceive that one part of the system could be in the state of sthenia, and another in that of asthenia, at the same time, but merely recognized these two diatheses. Disease was with him the result of a general condition. In these respects the doctrines of Brown differ essentially from those of Broussais, of which one of the fundamental propositions is, that there is neither a general exaltation nor a general diminution of the vitality of organs ; and further, that all diseases are primitively local. The study of revulsion would not emanate from the doc-

trines of Brown, because he did not estimate the localization of disease, but distinctly flows from those of Broussais, who denies the *general* exaltation or diminution of vitality, but who admits the partial, and on this founds his theory of disease and his mode of treatment; Brown considered the economy at large, Broussais the tissues and organs in particular.

The revulsive medicine is one, perhaps, more extensively employed in these countries than any other. Yet how few even pause to analyze its action, to consider its merits, or to estimate its dangers. How often is injury done by the abuse of the revulsive treatment, and how often have its evil consequences been owing to this, that the revulsives have only done their business too well.

M. Sabatier, to whom was adjudged the gold medal of the Society of Practical Medicine of Paris, for the memoir under review, commences by inquiring whether the distinction established by the ancients between revulsion and derivation is founded on truth. It is scarcely necessary to remind the reader that the term "*derivation*" was given to any means that would cause an irritation, or an afflux of humours, to a point in the vicinity of the diseased organ (*derivatio ad latera*), while that of revulsion was given to the same means and effect, operating at a point removed as far as possible from the diseased portion (*revulsio ad contraria*).

The discussions on these subjects in the schools until nearly our own time, related to the practice of bleeding almost exclusively. Hippocrates taught that the vein should be opened as near as possible to the diseased organ; the Arabians, the contrary. Hence the disputes which were carried on with the greatest animosity. The terms are now considered as convertible, and the subjects of revulsion or derivation involve a great portion of medical inquiry.

The following is the author's definition of revulsion taken from its results rather than its nature, for this involves phenomena, as to which it may be said that medicine is still in its infancy:—

> "Considered from its results and perceptible effects, revulsion is that vital phenomenon by which any morbid disposition affecting an organ is gradually diminished or promptly dissipated under the influence of some modification, which art, and sometimes also nature, induces or preserves for a certain period in one or many organs more or less remote from the first, and having with it either naturally or accidentally more or less direct relations."

After taking, as the basis of his views, the doctrine that irritation is the principal and primitive form of most diseases,

but admitting that in a few it exists only in a secondary manner, while in a third class it does not at all enter (asthenia), the author proceeds to some general observations on irritability and sensibility; after which, the means by which revulsion is effected, are enumerated and investigated.

Revulsives are considered as general excitants of sensibility, sometimes producing but simple excitation, sometimes complete irritation, and sometimes, as a consequence of this, inflammation. But in the actual state of the science, it must be admitted that no classification can be founded on this division, for who can say where one of these states begins and another ends, or shew that they are not stages of one and the same pathological condition; and especially, when we consider, that according as the action of revulsives is more or less energetic or repeated, they will cause successively excitation, irritation, and inflammation.

Revulsion, it will be remembered, was induced by art or by nature. The following is M. Sabatier's enumeration of the artificial means. These are divided into the exterior and interior means, as follows:—

I. Exterior means.

a. Superficial irritations of various intensity and duration, such as sinapisms, temporary blisters, rubefacients, heat, the warm bath, dry cupping, &c.

b. More deep-seated irritation and phenomena of inflammation of various intensity and duration, such as the actual cautery, moxa, the seton, &c.

c. Simple local excitation or irritation, with capillary congestion, and with more or less loss of blood from the part, such as the application of leeches, &c.

d. Direct excitation of local sensibility, communicable to other parts, and owing to special agents, such as electricity and galvanism.

II. Internal means.

a. Excitation of the digestive mucous membrane, causing increased activity in its physiological phenomena, such as the action of laxatives.

b. Irritation, and sometimes inflammation, of the same tissue, such as is caused by drastic medicines, or milder purgatives, too abundantly used, or often repeated.

c. The same influences on other mucous membranes, so as to re-establish suppressed discharges, such as stimulating injections into the vagina.

d. Excitation, irritation, or inflammation, produced on one or many organs in consequence of the absorption of certain substances on a particular surface, such as the use of mercury by

inunction. In this case the organs are more susceptible of being influenced by the particular agent than the absorbing surface itself. To this, however, the use of the tartar emetic ointment is an exception.

To this arrangement many objections might be raised; but although defective, it is of practical utility, as giving a succinct view of the artificial means for producing revulsion. But we are decidedly opposed to the following statement of the means employed by nature to cause revulsion: "These means are certain acute diseases developed during the course of an anterior disease," p. 13. We submit that this is neither a definition nor a description. It is not clear, it is wholly inadequate, and cannot be admitted in the present state of medicine. In intermittent fever, after the cold stage, there is revulsion to the surface, and so far, complete relief. Yet we cannot admit that the skin is the seat of an acute disease. An individual is exposed to cold, and the secretion of the kidneys is augmented. Yet this is not nephritis. The doctrine that disease is nothing but the increase or diminution of the physiological action of organs, however specious and ingeniously defended, is liable to too many objections; and it is to be wondered that our author built any theory on such an uncertain foundation. It is true that revulsion does occur by the supervention of a new disease, properly so called; and some of its most remarkable instances are of this description; but it is also true, that it may occur by a mere increase of the physiological action of a part, which requires something else to constitute a diseased condition of the organ.

Natural revulsion occurs variously; the modes enumerated by the author are, the revulsion from one portion of the surface to another, from the skin to the mucous membranes, and *vicè versa;* from the skin to other organs, besides the mucous membranes, as, for instance, the viscera, serous membranes, &c.; from one mucous membrane to another; from a mucous membrane to viscera; and from one parenchymatous organ to another. Examples of all these must be familiar to every practical man, and we would refer to Dr. Parry's Elements of Pathology for numerous instances of these phenomena.

There is a most interesting and important subject connected with natural revulsion, which our author passes by in silence; we allude to the investigation of the circumstances under which *natural revulsion* may be a favourable or unfavourable occurrence. It is plain that this must be determined by the relative importance to the system of the organs to which this revulsion takes place. Here was an opportunity of considering the phenomena of crisis, which the author has neglected. It is plain that a revulsion, in which the secondary involved a viscus more

important to life than the primary affection had done, would necessarily be an unfavourable revulsion. For example, the supervention of a pneumonia on the subsidence of a disease of the skin, or the occurrence of an apoplexy on the disappearance of an œdema of the extremities. The change of the seat of disease from the surface to the viscera must always be unfavourable, while that from the viscera to the surface must be advantageous. The first unfavourable, because the viscera are more important to life than the skin; and the second advantageous, because irritation forsakes parts in which disease is severe and dangerous, from their numerous sympathies, to settle in a tissue of less vitality and importance to the economy. The common example of measles will illustrate this. Before the eruption, the viscera are suffering, and in severe cases there are signs of irritation in all the splanchnic cavities; but when the exanthem appears, these are either wholly or in a great degree relieved. Should any cause produce an untimely retrocession of the eruption, the danger is great *from the sufferings of viscera.* It is a revulsion from the surface to the interior, as the case of relief was of revulsion from the interior to the surface.

Revulsion from one viscus to another is seldom so advantageous as that from the viscera to the surface; little would be gained by the subsidence of an inflammation of the lung if its price was an hepatitis, unless, indeed, that in the latter case the danger of mechanical death would be avoided. The substitution of an enteritis for a bronchitis, or of a gastritis for a pleurisy, would be scarcely advantageous, and particularly as in such cases the intensity of the two affections is not always the same, the secondary being sometimes much more violent than the primary, which it has succeeded.

But revulsion from the less to the more important tissues, is not always so unfavourable a circumstance; but then there is relief by secretion, by hemorrhage, and probably, as in the case of convulsions, by expenditure of nervous power. What, then, are the conditions or phenomena of a favourable crisis? Inflammation, advantageous only when its seat is on the surface, secretion, hemorrhage, and lastly, expenditure of nervous power. The last, so important in the pathology of epilepsy, is unnoticed by our author. In all these cases, previous to the critical evacuation, signs by determination or active congestion to the organ by which relief occurs, always precede the critical phenomena.

In the commencement of his work, M. Sabatier inquires whether every revulsion presumes necessarily, and in the first instance, an excitation of sensibility in some part of the organization. At the termination of the second chapter, he declares

that the development of this question will prove that there are two modes of revulsion; one, in which the excitement of sensibility in an organ developes physiological or morbid phenomena, in virtue of which, another organ, previously affected, returns to its normal state. This is the common acceptation of the term. In the second, according to him, this result may be obtained by certain means, which so far from causing any local excitation on a part more or less remote, act in diminishing the general sensibility, and consequently, restoring the diseased organ to its primitive state. In both these modes, however, it is the sensibility which is acted on; it is this which governs the phenomena. In the one, the local sensibility is excited; in the other, the general sensibility is depressed. This brings us to the consideration of bleeding as a revulsive means. By this means, in diminishing the natural excitant of general sensibility, we may suspend the progress of disease in one organ which is consecutive to a functional disturbance in another; for instance, in the case of cerebral congestion after menstrual suppression, in which, and in analogous cases, the healthy state of the brain and uterus is consequent on the bleeding. If the principal character of revulsion is to suspend or diminish the effects of super-excitation on an organ, then in this case bleeding may be considered as a revulsive, only that its mode of action is in a contrary sense to the ordinary one. In fact, the removal of excitation and its phenomena is in this instance what the production of excitation is in the more ordinary cases of revulsion. In the instance of bleeding, also, the necessary conditions for the return of the organ secondarily affected to health, are the same as those which in the ordinary mode apply to the organ primitively engaged.

It is to be remarked further, that the revulsion by bleeding differs in one essential particular from that of local stimulation, namely, that it is necessary that the return to health of the organ secondarily engaged must precede that of the part first affected.

Bleeding is only to be considered as revulsive when it re-establishes the equilibrium of functions between two organs, of which one has been affected by the modifications of the other. But in a case of primitive local inflammation, where bleeding merely acts in diminishing the mass of the blood, we cannot call it revulsive. The following remarks by Sabatier are pertinent:

"When a bleeding from the foot removes a cerebral congestion, does it cause the blood to abandon the brain to appear in abundance towards one of the lower extremities? Do we see its vessels distended, and the skin hot, red, and tense? Nothing of this kind occurs. The mass of blood has been diminished, and this alone suffices to remove the local excitation which caused the determination to the

head. The congestion has ceased, it is true, under the influence of the bleeding, but this has not acted as a revulsive. It has acted by removing from the individual the active and mechanical element of congestion, not by producing congestion or excitement in another organ, or reproducing in it the course of certain functions whose sudden interruption had caused the derangement of the first." P. 50.

In the cases also of plethora, and of mechanical obstruction of blood, bleeding cannot be considered as revulsive. Thus, we cannot recognize any revulsive action in the bleeding which dissipates a passive congestion, or removes an ascites or œdema from mechanical venous obstruction. Here the mechanical hyperemia results from the veins being obstructed while the arteries remain free, and bleeding either modifies or removes the morbid condition by diminishing the whole mass of the circulating fluid.

The use of local bleeding by means of leeching or scarification has long been enumerated among the means of revulsion, and, as will be recollected, is placed by our author in his enumeration of the artificial modes by which this result is obtained. In his opinion, however, as expressed in the course of the work, leeches may operate as revulsives both as local stimulants, and also, like general bleeding, by diminishing the sensibility at large. But more frequently, particularly when applied in great numbers, he believes that they act in the latter manner, but that in this case all that has been said about general bleeding will apply.

The subject of local bleeding is, however, far from being cleared up, and it is to be regretted that our author has not devoted more of his work to it. We cannot agree with M. Sabatier in believing that in the majority of cases local bleeding produces its effects merely by the quantity of blood drawn. If such were the case, the lancet in all instances should be preferable to leeches ; but this every day's experience contradicts. In many of the low forms of gastro-enteric inflammation, how useless, or even injurious, is the effect of a general bleeding, how advantageous and safe that of the use of leeches. Again, supposing that leeches operated by the second mode of revulsion, the point on which they should be applied would be a matter of indifference, another instance in which the theory is contradicted by experience.

The second part of the work is devoted to the therapeutic application of revulsives, and commences by an inquiry into the difference between the revulsive and stimulating modes of treatment or medications, to use a French expression. This question, so difficult from the fact of both these modes of treat-

ment having a common point of departure, namely, the excitement of sensibility, is ingeniously handled by the author :—

"Whether irritation be primitive or secondary, whether the solids or fluids be altered primitively or secondarily, in all these cases, that is to say, in all diseases, the ultimate analysis will only discover an excess or deficiency of excitation. To the first is related the revulsive, to the second, the stimulating medicine. The first combats the phenomena of an anterior morbid excitement by a new excitement established at another point; the second produces an excitement on an organ, or group of organs, which, by their sympathies, is felt over the whole economy. The first only influences a single part of the organization by the intervention of an another; the second affects the whole organization by the influence of one of its parts."

But although a line of distinction may be thus laid down between the revulsive and stimulating modes of treatment, yet we must never forget that with the probable exception of bleeding in a single case, revulsives are all stimulants. Sabatier does not sufficiently insist on this point, which, when we consider the universal employment of the revulsive medicines, becomes of great importance. It is plain that they all act by stimulating a particular part of the organization; but if from excess of that stimulation, whether by too great or too frequently a repeated dose, or from the irritability of the patient, an action sufficient to excite sympathetic irritations be produced, then, what was first a local becomes a general stimulant, and consequently improper in diseases in which an antiphlogistic treatment is indicated. Even where the general stimulation is not induced, revulsives may be and constantly are injurious from the excess of irritation which they may produce in the organ to which they are more directly applied, an irritation which may terminate in disorganization, *even though fever be not excited.* In this way the use of purgatives may induce ulcerations of the intestines, scirrhous contractions, perforations, &c. If there is a fact that requires to be more strongly impressed than another on the minds of British practitioners, it is, that the internal revulsives are not direct antiphlogistics; that if they cure disease, it is by a violent excitement of another organ, which relieves itself by supersecretion; but that in many cases, even where a free secretion takes place, the irritation passes the point of safety, an acute inflammation, causing fever, is induced, or a more insidious and dangerous process sets in, and the part becomes incurably disorganized.

These observations apply to all cases of internal revulsion, but particularly to the use and abuse of the purgative treatment. Almost every instance of attempts to produce internal

revulsion are directed upon the gastro-intestinal surface, as if this was the organ of least consequence to life, endowed with the least sensibility, and liable to the least disease from over stimulation. In the present state of British medicine, the treatment of many diseases is attempted by gastro-intestinal revulsion; and it happens in thousands of instances that the very organ which is thus over-stimulated has been the original seat of the disease.

Let us inquire, then, what are the conditions necessary for the simple and advantageous action of a revulsive. These seem to be, that it shall excite an organ to this degree only, that the irritation shall not be reflected on the system so as to produce fever; and secondly, that disorganization of the part be not induced. If the organ be a secreting organ, the super-secretion will in some instances prevent the occurrence of these evils; but to this rule there have been many exceptions. In the investigation of the effects of the general stimulation on the economy which revulsives sometimes induce, there remains much to be done; and it is probable, that in certain cases of chronic or sub-acute disease, this general stimulation may act in removing or modifying the original disease.

It is obvious that the localization of disease is necessary for the application of the revulsive medicine. Hence we should conclude, that in those cases in which the fluids are engaged primarily, and in which diseased action is universal, the revulsive treatment would be inapplicable. This is the opinion of M. Sabatier, who declares, that as an exaltation of sensibility of an organ has not been the point of departure in the disease, and that as on dissection we rarely find any manifest alteration of organs, the revulsive treatment is useless. The instances of uterine phlebitis, purulent absorption, and scurvy, are adduced in support of the position. Yet it is in cases where the fluids are supposed to be engaged that we see some of the most striking examples of natural revulsion; we allude to the class of exanthemata; and although we would admit the conclusion of Sabatier to a great degree, yet it must be allowed, that even in cases of disease of the fluids, where local inflammations have arisen, the revulsive treatment is applicable. In the secondary inflammations of typhus fever, revulsives have been long found of utility, not, perhaps, so great as in cases of primary local disease.

The remainder of M. Sabatier's work is occupied with the consideration of the application of the revulsive treatment in cases of local disease. This is well worthy of the perusal. He strongly insists on the important practical point that revulsives

are dangerous in the early period of acute diseases, from their liability to add to the general excitation, and as strongly condemns the unphilosophical and dangerous practice of attempting to force nature by an excess of the revulsive treatment. If revulsives are to be beneficial, that effect will be soon perceived; but if this result does not appear, let us beware how we over-stimulate; let us recollect, that although not presenting its usual action, the agent is not idle, but in all probability exercising a deleterious effect on the system at large.

Without possessing much originality, this essay contains a tolerable abstract of the state of our knowledge on revulsion. Most of this has been borrowed from the writings of Broussais; but it cannot be denied that our author has made some interesting and ingenious additions to the views and principles of the physiological school.

The Cyclopædia of Practical Medicine. Edited by JOHN FORBES, M. D., ALEXANDER TWEEDIE, M. D., and JOHN CONOLLY, M. D. London, published in monthly Parts. Part II.

IN our last number we presented to our readers an analysis and examination of the article Cerebral Apoplexy in the Cyclopædia. Next in order we enter on the consideration of a scarcely less important disease, "Pulmonary Apoplexy." The article on this disease is written by Dr. Townsend, well known to the profession as an ardent and successful cultivator of pathology, to whom, and to his colleague in the task, Dr. West, the profession of these countries is deeply indebted for their classical and correct translation of Andral's splendid work on pathology.

Pulmonary apoplexy is one of those diseases for an accurate knowledge of which we are indebted to Laennec.

"It is true that this affection had been noticed by earlier writers, and even described under its present name. Haller, in his Opuscula Pathologica, gives a brief and melancholy account of the death of a friend who fell a victim to this disease; his description of the morbid appearances, though general, is sufficiently characteristic of the disease: 'In pulmone utroque, non inflammatio, non ulcus, sed sanguinis universalis effusio fuit, ut sudore sanguineo in cellulosam fabricam effuso, et sensim collecto, nigerrima demum magna pars visuris esset.' M. Lereillé read a memoir on the subject before the Academy of Sciences in the year 1816; and Doctor Hohntaum published an essay

on pulmonary apoplexy at Erlangen in 1817. M. Laennec's treatise was not published until 1819: however, as the affection was entirely unknown as a common cause of hæmoptysis before the publication of his work, and as no preceding writer had given its precise anatomical characters, the merit of having first accurately described the disease must be accorded to Laennec, even though the more equivocal merit of its denomination may be contested by others."

The name pulmonary apoplexy sounds strangely. The term apoplexy, in its original sense, meant a sudden striking down or cessation of the functions of the brain, without reference to the varied causes producing that cessation. In many cases, however, the cause was discovered to be an effusion of blood; and hence the term apoplexy came to be used as synonimous with effusion of blood in the brain. From the analogy existing between the appearances presented by effusions of blood into the substances of the lungs and of the brain, Laennec applied to the former the term pulmonary apoplexy, meaning by it an effusion of blood into the vesicular texture of the lungs, that portion of these organs constituted by the interweaving of the very extremities of the bronchial tubes. We might have discovered a better name, but as it comes to us sanctioned by the authority of Laennec, it may perhaps, as Dr. Townsend remarks, be as well retained; the name is of little consequence provided we form a correct notion of the nature of the disease.

The appearance of a lung in which there are several nodules of pulmonary apoplexy is very singular. The firm cellular septa which divide the lobules of the lung from one another, frequently bound also the effusions of blood, so that while one lobule or congeries of air tubes is completely solidified by congested blood firmly impacted in it, the surrounding lobules often remain perfectly free from any congestion, and permeable to air. When several lobules immediately under the pleura are involved in the disease, the intervening portions of lung remaining sound, the lung presents an appearance as if a number of dark-coloured plumbs were inbedded in its substance, each slightly elevating the pleura covering it. This is the general form which pulmonary apoplexy assumes. In this form the texture of the lung, even where the impaction of blood is thickest, is little or not at all injured. The fine vesicular texture is still preserved. The coagulated blood can be turned out in small grains from the extremities of the minute tubes; and if the whole be carefully and repeatedly washed, the blood may be completely removed, leaving the vesicular texture unbroken, with the exception of perhaps a minute rent from which the blood had been poured out. There are other varieties of pulmonary apoplexy, in which the mischief done is much more

serious. Dr. Townsend has divided pulmonary apoplexy into three varieties, according to the varying appearances presented; and although these varieties may all be considered as only more or less severe forms of the same disease, the accuracy of description is very much served by the division. The first form is that already alluded to, in which the blood is simply accumulated in one or more lobules, the vesicular texture being little or not at all injured. In the second form or variety the vesicular texture of the lung is torn, and the site of the pulmonary apoplexy, which may occupy a considerable portion of the lung, presents a broken up and semi-fluid mass, consisting of detritus of lung mixed with fluid or semi-coagulated blood. The third constitutes a still more severe form of the disease, in which the texture of the lung is not only broken up, as in the second form, but the pleura is ruptured, and blood is poured out into the pleural sac.

The first form of the disease is thus described:—

"It is always partial, and rarely ever occupies a considerable portion of the lungs; its more ordinary extent being from one to four cubic inches. It is almost always very exactly circumscribed, the induration being as considerable at the very point of termination as in the centre. The pulmonary tissue around is quite sound and crepitous, and has no appearance whatever of that progressive induration found in pneumonia. The substance of the lung is indeed often very pale around the hæmoptysical induration; sometimes, however, it is rose-coloured, or even red, as if tinged with fresh blood; but even in this case the circumscription of the indurated part is equally distinct. The indurated portion is of a very dark red, exactly like that of a clot of venous blood. When cut into, the surface of the incisions is granulated as in a hepatized lung: but in their other characters these two kinds of pulmonic induration are entirely different. In the second degree of hepatization, we can perceive distinctly the black pulmonary spots, the blood-vessels, and the fine cellular intersectures, all of which together give to this morbid state the aspect of certain kinds of granite. In the induration of hæmoptysis, on the contrary, the diseased part appears quite homogeneous, being altogether black or of a deep brown, and disclosing nothing of the natural texture of the part, except the bronchial tubes and the larger blood-vessels. The latter have even lost their natural colour, and are stained with blood. In scraping the incised surfaces of their parts, we can detach a small portion of very dark half congealed blood, but in a much less proportion than we can press out the bloody serum from a hepatized lung. We sometimes find two or three similar indurations in the same lung, and frequently both lungs are affected at the same time."

In the second or more severe form, the appearances presented are different.

"The blood, instead of simply accumulating within the air-cells, ruptures their delicate parietes, breaks down the structure of the lung, and is extravasated into the lacerated tissue. It is to this form of the disease that the name of pulmonary apoplexy is more strictly applicable, as being most analogous to the condition of parts which exists in cerebral apoplexy."

Dr. Townsend proceeds to point out with accuracy and to account for the difference between this and the first form.

"The anatomical characters of this form of pulmonary apoplexy differ materially from those described by Laennec. The seat of the disease, instead of being circumscribed, solid, and presenting a granular surface, when cut, is perfectly uncircumscribed, feels soft and fluctuating to the touch, and when cut into, exhibits a mixture of fluid and clotted blood infiltrated through the parenchyma of the lung, which is ruptured and broken down. These differences may, however, be satisfactorily accounted for; in the hæmoptoic engorgement, as described by Laennec, the circumscribed, solid, dark-coloured masses, varying in size from one to four inches, are evidently caused by the infiltration of blood into the air-cells of the part, and its coagulation there; as any one may satisfy himself by examining in the strong light of the sun the granular surface, which a section of the part exhibits, and by scraping it gently with a scalpel, so as to turn out the little rounded coagula from the cells in which they are moulded, after which the part will exhibit a distinct cellular structure, exactly resembling a section of the corpus cavernosum penis. The reason of the lesion being in general so accurately circumscribed, is, that the cellular tissue which invests and isolates each lobule prevents the escape of the effused blood into the adjoining lobules. The solidity of the part proceeds from the serous portion of the blood being absorbed, and the fibrinous coagulum becoming intimately combined with the tissue of the part; for in those cases where death occurs soon after the hemorrhage, the blood is uniformly found in the fluid state: and lastly, the dark colour which the hæmoptoic induration presents, may be accounted for by the stagnation of the extravasated blood, which uniformly produces this effect, as in the familiar example of an external contusion, and in Hunter's well known experiment of intercepting a portion of artery between two ligatures, and finding, after a certain time, that the blood thus confined had lost its arterial colour, and assumed a dark venous hue. In this form of the disease there is no solution of continuity, no breaking down of the pulmonary tissue, but simply an infiltration of blood into the spongy texture of the part.

"But if the texture of the organ is less resisting, or the force of the infiltrating fluid more irresistible, the pulmonary structure gives way, and the interlobular partitions which served to bound the progress of the effusion being broken down, it ceases to be circumscribed. In this form of the disease the blood is seldom wholly coagulated, and we believe never so perfectly as in the hæmoptoic

engorgement. For this fact, several satisfactory reasons may be assigned. In the first place, when the hemorrhage is so violent, death generally follows before the blood has had sufficient time to coagulate perfectly, and to have its aqueous parts absorbed. It generally happens also that those extensive hemorrhages are connected with a peculiar liquid state of the circulating fluid, which diminishes its tendency to coagulate, and disposes it to pass off more freely by the exhalants, as in cases of scurvy, purpura, &c. Besides which, we may suppose that blood, when effused in a large mass, is not as favourably circumstanced for having its thinner part absorbed, as when minutely subdivided, and each division placed in contact with so active an absorbing surface as the walls of the air-cells."

He describes a case of this second form which came under his own observation:—

"A young delicate-looking man in an advanced stage of fever stooped out of bed to take up his spitting-pot, which had fallen; while in the act of stooping, he became giddy, lost all consciousness, and fell on the floor: he remained insensible for some minutes, but after throwing up a large quantity of blood, he recovered so far as to ask for a drink of water; he drank with avidity, and again relapsed into a state of apparent insensibility, and died within an hour, discharging a quantity of blood from his mouth and nose. On dissection, which was made in eighteen hours after death, all the air-passages from the mouth to the lungs were found filled with dark fluid blood. The right lung did not callapse when the chest was opened, except its upper lobe, which appeared healthy, and of its natural colour: the the middle and lower lobes were externally of a uniform deep red colour, and when pressed under the finger, conveyed a distinct sense of fluctuation. When cut into, a quantity of fluid blood rushed out, bearing along with it a number of grumous clots, and several masses of broken down pulmonary tissue. The interior of the lung presented a shreddy appearance, and resembled a sponge which had been steeped to saturation in blood."

The third variety of the disease, which is very rare, only differs from the second in this circumstance, that in addition to the breaking up of the texture of the lungs, the pleura also gives way, and the blood escapes into the pleural sac.

After some ingenious observations on the etiology of the disease, Dr. Townsend proceeds to enumerate its exciting causes. Of these he states the most frequent to be organic diseases of the heart, and of those diseases narrowing of the left auriculo-ventricular opening to be a more frequently exciting cause than the other organic heart affections. We can easily understand the connexion between pulmonary apoplexy and narrowing of the left auriculo-ventricular opening. In cases of narrowed auriculo-ventricular opening, if the action of the heart be quickened by mental excitement or physical ex-

ertion, the blood can no longer be sent in its due quantity from auricle into ventricle. It accumulates behind the auricle in the pulmonary vessels; they are unable to resist the sudden strain upon them; they give way, and from the weakness of their parietes, or the violence and suddenness of the congestion, the effusion of blood into the vesicular texture of the lungs, constituting pulmonary apoplexy, is more or less extensive. Whatever causes congestion of blood in the lungs by impeding its free transmit, may in the same manner bring on this disease. There are, however, other causes of pulmonary apoplexy depending on the state of the vessels themselves, independent of any immediate exciting cause. With the nature of these causes we shall probably never be well acquainted. Thus, an individual is exposed to cold, and an attack of pneumonia is the consequence; another is exposed to the same, and the vessels, instead of permitting the congestion of pneumonia to occupy them, suddenly pour out their blood, and pulmonary apoplexy is the result. In such a case, the disease is said to be idiopathic.

In order to make pathology instructive to practice, and to enable us to assist nature in her curative efforts, it is necessary for us not only to follow a disease from its mildest to its most aggravated form, but also to retrace it step by step through whatever process nature takes to remove that disease, and restore the parts to their healthy state. For these reasons, it is useful to know how pulmonary apoplexy is removed, and what are the changes taking place in the lung during its restoration to health. In the first variety of pulmonary apoplexy, or infiltration of blood into the minutes air tubes of a few scattered lobules—

"Laennec states that resolution of the hæmoptoic engorgement takes place with considerable facility, whatever may be the severity of the disease. In those instances where he had an opportunity of tracing the progress of this resolution by dissection, he found that the indurated parts passed successively from dark red to brown or pale red, and that, in proportion as the colour faded, the parts lost their granular texture and density. When the resolution is complete, it leaves no trace of the disease in the pulmonary substance."

Cruveilhier believes that in some cases inflammation will be set up, suppuration established, and a cavity formed, the sides of which will be lined with false membrane, and finally, cicatrized. In severer cases, the texture of the lung is so much injured, and its circulation interrupted for so long a time, that it dies, and then nature gets rid of the dead mass by forming a line of separation, by absorption between the living and the dead part, the dead portion being then thrown off as slough; and

then pulmonary apoplexy, in its severer forms, may terminate in gangrene of the lung.

"Lastly, pulmonary apoplexy has been observed to occur as a precursory symptom of gangrene, and may, we conceive, in some cases contribute to produce it. In one instance particularly we were enabled to follow the different stages of the disease from the formation of an extensive hæmoptoic engorgement to its conversion into a large gangrenous abscess.

"The rationale of this transition may, we conceive, be explained thus: in the hæmoptoic engorgement the circulation through the indurated mass is completely obstructed by the solidification of the part, and by the vessels leading to it being plugged up with coagula of fibrine. This plugging up of the vessels has been noticed by Laennec, and more particularly by Bouillaud (Op. cit.), and we have repeatedly ascertained the fact on dissection. Now, if we compare the condition of the part thus circumstanced with the pathology of gangrene as laid down by the most recent and approved authorities on the subject, we shall find it placed under precisely the most favourable circumstances for passing into gangrene, or, as the disease has been more appropriately designated by Dr. Low, *putrefactive disorganization* of the ung."

We come next to the diagnosis of this formidable disease. In the severer forms of the disease in which the patient dies suddenly there is often no sign whatever.

"In the more common and less violent forms of the disease, in which an accurate diagnosis is of much more practical importance, the symptoms most pathognomonic, as enumerated by Laennec, are, violent sense of oppression in the chest; great difficulty of breathing; cough, accompanied with irritation of the larynx, and sometimes by very acute pain of the chest; expectoration of bright and frothy, or black and clotted blood, quite pure, or mixed with saliva or mucus; frequent full pulse, with a particular kind of vibration even when soft or weak, as it frequently is after a day or two. There is rarely any positive fever, and the heat of the skin continues natural, or nearly so; frequently the heart and arteries yield the bellows sound to a very marked degree. Of all these symptoms, the spitting of blood is the most constant and most severe, and returns by fits, accompanied with cough, oppression, anxiety, intense redness or extreme paleness of the face, and coldness of the extremities. When the hemorrhage is very great, it comes on sometimes with a very moderate degree of cough, accompanied by a convulsive elevation of the diaphragm, like that which takes place in vomiting."

Of all the symptoms above enumerated, the hæmoptysis is the only one to be depended on; and the general rule is, that when the blood is thrown up in large quantities, the disease is pulmonary apoplexy, when only in very small quantities, it is

bronchial hemorrhage, or an exudation of blood from the bronchial vessels. The stethoscopic signs of the disease are unsatisfactory. Should the apoplectic engorgement be confined to lobules in the centre of the lung, the two principal stethoscopic signs, viz., dulness of sound on percussion, and absence of respiratory murmur, cannot be detected. Taken in conjunction, however, with the ejection of blood, they often afford very useful information as to the extent and the particular seat of the disease. The quantity of blood thrown up in an attack of pulmonary apoplexy is sometimes enormous. We have seen two quarts thrown up in a few minutes, and Laennec mentions a case in which ten pounds were thrown up within the space of forty-eight hours.

The next consideration is treatment. On this Dr. Townsend is too brief. He refers us, it is true, to hæmoptysis, which article has not yet been printed, for a detailed account of the treatment found to be most useful in arresting pulmonary hemorrhage. We wish he had given the treatment in the present article. Pulmonary apoplexy is a disease of such importance, requiring such instant and decisive measures, and on the immediate adoption of which, in many cases life depends, that the connexion between the disease and its treatment cannot be too intimate in the mind of the practitioner. It would be unfair, after the reference Dr. Townsend has given us, to make any observation on the short portion of the article devoted to treatment. This portion of the subject is, however, of such consequence, that we shall take care to return to it when considering hæmoptysis. We may here seize the opportunity of correcting an advice given by Laennec in his directions for the treatment of this disease. He says, "Il est au moins necessaire de faire lever le malade de temps en temps pour le rafraichir." Instead of this advice being followed, we are quite sure that for a long time after the hemorrhage has ceased, the most absolute rest is required. The ruptured vessel requires, like a ruptured vessel in any other part, its due time to heal; its mouth may be only stopped by a plug of blood, and remembering this, we ought to be careful how we permit any motion that may have the effect of interrupting the perfect closure of the vessel. We have seen a violent hemorrhage produced by the mere exertion of speaking a few words several days after the original attack, and when the patient would not believe but that all danger had passed away. Dr. Townsend, in the article which we have now examined and analyzed for our readers, has given us the best account of the pathology and diagnosis of pulmonary apoplexy which we have

met, and we trust that our readers and ourselves will be equally gratified in perusing the details of its treatment in the article "Hæmoptysis."

Principles of Geology. By Charles Lyell, F. R. S., Foreign Secretary to the Geological Society, Professor of Geology to King's College. London, 1832, vols. i and ii.

In seeking to obtain a knowledge of the laws which regulate the created universe, we are actuated by the same spirit which induced the great philosopher of the moderns to give, amidst the various kinds of research after Truth, a preference to those which tend to unveil the real state of existing things; "tollunt larvam et velum a rebus naturalibus quæ plerumque sub varietate figurarum et apparentiæ externæ occultantur aut obscurantur." And, as we advance in our inquiry, we see the different branches of science melt into each other, and discover connections between those which at first appeared the most remote. Every where we find the same simple elements, though variously combined; every where we trace the same laws; and hence the mind is brought to feel the mutual action and reaction on each other of the parts, on the equilibrium of which the stability of the universe depends, and the consequent change in all, which an alteration in any one must produce.

To extend this reasoning to the whole planetary system seems beyond the limited powers of man; nor is it necessary that we should do so, as it is probable that the variations of parts, take place in smaller systems within which they may be considerable, whilst the resulting aggregate, by mutual compensation, continues the same. The earth is one of these systems, and we shall now accompany the author of the able work before us, in his attempt to estimate the number and amount of forces acting upon its parts, and the effects they produce on each other, premising with him, that no hypothesis can be admitted which does not explain the changes in all parts of our system; for assuredly, it would be insufficient to point out a cause which might indeed have acted on and modified the surface of the earth, unless at the same time we shew that it was equally efficient either directly or by calling into existence an intermediate cause to have altered the atmospherical, the botanical, the geological relations of those bodies and beings which either have

inhabited or do now inhabit the earth. This necessity constituted the great difficulty of our author's task, when endeavouring to extend the dominion of actual causes over the complicated phenomena of geological science; and it has, therefore, called forth some of the acutest effects of his logic.

But before we go further, let us turn to the historical chapters of the work, that we may know what had been previously imagined or done. When the early history of even the actions of mankind is lost in fable, we need not wonder that the records of creation should have eluded the search of mortal vision, and phantoms of imagination supplied the place of realities; in the dim obscurity, therefore, of Hindoo and of Egyptian mysteries, we look for little more than monstrous representations of the mode of action by which divine intelligence might have called the world into being, the fitting creatures of every attempt to render tangible to human understanding that first and unseen act; and whilst we avoid the error of considering such conceits, as that (vol. i. page 11.) "the first chaotic mass had been pro-" duced in the form of an egg by a self-dependent and eternal " Being," and that "it required the mysterious functions of a " masculo-feminine principle to reduce the component elements " into organized forms;" any thing more than coarse efforts to depict the first impulse of creative power, by a reference to some of the operations of nature originating in the very laws then imposed on matter, we contrast such vain illustrations with the sublime simplicity of the sacred volume, in which each separate act of creation is made to flow direct from the divine volition; as "let there be light, and there was light."

These dreams of ancient sages, we shall, however, sometimes find illumined by a passing ray of reason, and when, (page 5,) "in the institutes of Menu, the sacred volume of the Hin-" doos, to which, in its present form, Sir W. Jones ascribes an " antiquity of at least 880 years before Christ, we find the sys-" tem of the alternate destruction and renovation of the world " proposed;" we may pause to inquire what share observation had in directing the flights of eastern fancy. Menu, in describing the operations of the divine soul, proceeds, (page 5) "thus " that immutable power by waking and reposing alternately " revivifies and destroys in eternal succession this whole assem-" blage of locomotive and immoveable creatures;" and again, (page 6) "there are creations also and destructions of worlds " innumerable." Such passages are striking, yet by their very comprehension they seem to revert back to religious mysticism, without seeking the origin of the notions they convey in actual observation of "the marks of former convulsions;" we are induced to think that the change of seasons, the growth and

decay of plants, the birth and death of man, were likely to generate in the speculative minds of that "class of men, expressly set "apart from the rest for study and contemplation," more extended views of a similar birth and death in the world itself. Prone indeed, as they were, to elucidate the unknown by the known, such an extension was natural, and it is strongly developed in the doctrines of the Egyptians, who not only (page 9) "believed "the world to be subject to occasional conflagrations and de-"luges, whereby the Gods arrested the career of human wicked-"ness, and purified the earth from guilt;" but also, "that after "each regeneration mankind were in a state of virtue and happi-"ness, from which they gradually degenerated again into vice "and immorality," a typical representation of moral and mental decay on the same principle as that of the natural body. Some support, also, may have been afforded to the Egyptian doctrine of deluges, (as the means of alternate destruction and renovation of the world), by the periodical inundations of the Nile, and it is also possible that the burning heats of the climate may have been amplified into that of conflagrations. Not then to chance do we ascribe these doctrines, though we see little reason for supposing that they were based on geological observations.

From the active and inquiring minds of the Greeks, an advance in this, as in other sciences, was to be expected, and yet we hesitate to admit, that (page 15) "from the works of Aris-"totle, and from the system of Pythagoras, we might certainly "infer that those philosophers considered the agents of change, "now operating in nature, as capable of bringing about in the "lapse of ages a complete revolution." The illustrations quoted from Ovid, of the Pythagorean doctrine, "that nothing "perishes in this world," and "although nothing retains long "the same image, the sum of the whole remains constant," are, as facts, curious, and demonstrate (at least in Ovid) much attention to passing phenomena, though they fail to prove that Pythagoras discovered in the visible and present changes of sea and land, the workings of agents of change sufficient to have operated with their present intensity, "a complete revolution," and, "if Aristotle considered occasional catastrophes happen-"ing at distant intervals of time, as part of the regular and ordi-"nary course of nature," he might, indeed, be said to refer effects to actual causes, but not to the simple agents of change, now operating. In the opinions of Strabo, there is a closer approximation to our author's views, and his very words might have been adopted, when he says, (page 19,) "it is proper to derive "our explanations from things which are obvious, and, in some "measure, of daily occurrence, such as deluges, earthquakes,

" volcanic eruptions, and sudden swellings of the land beneath the sea." Yet, after allowing full credit to the ancients for their penetrating discernment of some of the changes going on in the world, we must acknowledge that they left the connexion of cause and effect imperfect. Such, indeed, is the ultimate opinion of Mr. Lyell, who concludes his comment by saying, that (page 20) " the ancient History of the Globe was to " them a sealed book, and, although written in characters of " the most striking and imposing kind, they were unconscious " even of its existence." Nor, we may add, were its pages closed to them alone, long were they only partially unfolded to the moderns, and it is but as yesterday that the hand of Cuvier expanded them fully to the gaze of the present generation.

To more modern periods then let us now recur. In whatever light we view the doctrine of a deluge, admitting its universality, or, with our author, separating it into many of partial extent, we perceive readily the great influence which attempts to reconcile to its operation geological phenomena, must necessarily have exercised on the progress of the science. It was thus that the arguments of Fracastoro, when he declared his opinion that fossil shells (page 23) " had all belonged to living animals " which had formerly lived and multiplied where their exuviæ " are now found," and " demonstrated the futility of attributing " the shells in question to the Mosaic deluge," were met by such notions as that a certain, (page 25,) " materia pinguis, or fatty " matter, set into fermentation by heat, gave birth to fossil organic " shapes"—that petrified shells had, in some cases, acquired their form from (page 25) " the tumultuous movements of ter- " restrial exhalations," that they were mere stones which had assumed (page 26) " their peculiar configuration from the " influence of the heavenly bodies," or that they were " mere " sports of nature." Such explanations were given of all appearances not easily brought within the action of the deluge, and when they were found untenable, the Noachian deluge was still clung to for a considerable time, as the only cause of the existence on land of marine fossils, which on the other hand were considered its proofs. By this supposed necessity of bending every phenomenon to the sacred account of the creation and of the deluge, the mental efforts of the strongest minded were cramped, and the vision of the clearest sighted darkened. Hooke and Ray did not entirely escape its effects, and under its injurious influence the " *Minute Examination of British Strata,*" by Woodward, led to no useful result, whilst Whiston was induced by it to call down a comet from its orbit; and Burnet, in his " *Sacred Theory of the Earth,*" was hurried into a maze of fanciful conjecture, as wild as an Eastern fable. The ineffi-

ciency, however, of the Noachian deluge to account for ancient formations, was felt by many, and it was exposed by Holbach; the sound principle being even in 1721 laid down by Vallisneri, while commenting on the Woodwardian theory, that (page 41) "the interests of religion as well as those of sound philosophy "had suffered by perpetually mixing up the sacred writings "with questions in physical science."

The shackles thus imposed on reason being once loosened, science proceeded on in its advance towards correct opinions of natural appearances and their causes, with an accelerated, though not always with a firm and steady step. As yet, indeed, its movements were wavering and uncertain, sometimes too cautiously slow, oftener precipitately rash, sometimes leaning to one side, and sometimes to the other. Thus Moro (page 46) "derived all the stratified rocks from volcanic eruptions," amplyfying to the utmost extent the notions of Hooke and Ray; and (page 47) "Buffon attributed no influence whatever to sub-"terranean movements and volcanoes, but returned to the uni-"versal ocean of Leibnitz," and maintained that (page 48) "the "waters of the sea have produced the mountains and valleys of "the land; the waters of the heavens reducing all to a level, will "at last deliver the whole land over to the sea, and the sea suc-"cessively prevailing over the land, will leave dry new continents "like those which we inhabit," an opinion which, at the demand of the Sorbonne, he was obliged to recant as unorthodox! We cannot even briefly go through the list of those geologists, who (especially in Italy) were now acquiring more accurate knowledge of fossil remains, of the strata containing them, and of the disturbances to which, by subterranean forces, they may have been subjected. In 1753 Lehman divided mountains into three classes, and Arduino in 1759 (page 49) "recognized the dis-"tinction between primary, secondary, and tertiary rocks." In 1760 Michell (page 50) "advanced many original and philoso-"phical views respecting the propagation of subterranean move-"ments," and described "the arrangement and disturbance of "the strata, their usual horizontality in low countries, and their "contortions and fractured state in the neighbourhood of moun-"tain chains." Soldani (page 52) "first remarked the alterna-"tion of marine and fresh water strata in the Paris basin." Spallanzani (page 53) "pointed out the analogy between the "deposits of modern and ancient seas, and the habits and "arrangement of their organic inhabitants." Pallas, in 1778, announced, after an attentive examination of the two great mountain chains of Siberia, that (page 54) "the granitic rocks "were in the middle, the schistose at their sides, and the lime-"stones again on the outside of these: and this he conceived

" would prove a general law in the formation of all chains com-
" posed chiefly of primary rocks." Saussure also, by studying the structure of the Alps, and Jura provided valuable data for those who followed him; and a sufficient foundation was now laid for the more systematic arrangements which commenced with Werner. So great was the charm of Werner's eloquence and varied knowledge, that (page 56) "in a few years a small " school of mines, before unheard of in Europe, was raised to " the rank of a great university, and men already distinguished " in science studied the German language, and came from the " most distant countries to hear the great oracle of geology;" a noble example of the force of genius, which we would fain see followed in the University of Dublin, as yet without a professor of geology.

Werner advocated the principle of successive formations by aqueous depositions; even (page 58) "basalts and all other rocks " of the same family in other countries were, according to him, " chemical precipitates from water," and his opinions were therefore quite opposed to those of many preceding geologists. Raspe having in 1768 " truly characterized the basalts of Hesse as of igneous origin," and Faujas, in 1778, "published his de-" cription of the volcanos of the Vivarais and Velay, and shewed " how the streams of basalt had poured out from craters which " still remain in a perfect state," and this opposition, to what is now received as almost demonstrated truth, was long continued by his disciples, and in the case of Daubuison, with considerable acuteness. Though Werner thus by his dictum caused a retrograde movement, champions of the more correct opinions were still in the field, and the labours of Desmarest and of Dolomieu were sufficient to support the Vulcanists against the zeal of their opponents the Neptunists, these being the designations of the rival geological sects.

A champion of a higher order and of a more original cast, soon appeared in Hutton, who in 1788 first attempted (page 61) " to dispense entirely with hypothetical causes, to explain the " former changes of the earth's crust, by reference exclusively " to natural agents, and to give fixed principles to geology, as " Newton had succeeded in doing to astronomy." "The ruins " of an older world," said Hutton, "are visible in the present " structure of our planet, and the strata which now compose our " continents have been once beneath the sea, and were formed " out of the waste of pre-existing continents. The same forces " are still destroying, by chemical decomposition, and mechanical " violence, even the hardest rocks, and transporting the materials " to the sea, where they are spread out, and form strata analo-" gous to those of more ancient date; although loosely deposited

" along the bottom of the ocean, they become afterwards altered " and consolidated by volcanic heat, and then heaved up, frac- " tured, and contorted." Objections urged against this theory, as applied to the formation of limestone, were removed by the experiments of Sir James Hall, which proved that under great pressure, such as that of a deep ocean, the carbonic acid would not be expelled by the intense heat necessary for consolidation; and the discovery in Glen Tilt of granite veins " branching out " from the principal mass, and traversing the black micaceous " schist and primary limestone," fully demonstrated the great extent of igneous action, and identified, in that respect, the crystalline rocks with basalts. At a future stage of our remarks we shall inquire whether, as our author considers, Hutton (page 63) " attributed an undue influence to subterranean heat;" at this, it is enough to observe, that, illustrated by Playfair, his theory successfully maintained its ground against the attacks of Kirwan and Deluc, until by the gradual extension of the circle of its adherents, it has almost expelled the Wernerians from the field. Hutton had little information concerning organic remains, but the labours of Mr. W. Smith, who published his " *Tabular View of the British Strata*," in 1790, having shewn their paramount importance in identifying strata, they have since been studied with such ardour and success, that now they are considered a test of the order and relative ages of strata, far more certain and safe than mineral structure; whilst at the same time, they open out new and brilliant views of the harmony and order of nature.

So deeply interesting is the spectacle of the human mind awakening in the cradle of its infancy to the first perception of external objects, and gradually acquiring with each portion of intellectual food, strength for the digestion and assimilation of new and larger portions, until it has attained the force and energy of a giant, that we could not pass on without, for a moment, gazing on the delicious scene. In the work itself, the picture is so ably drawn, that the originality of some portions of it has been disputed by even Conybeare; perhaps it will yet bear some additional touches, and further inquiry into old works, especially the Transactions of Academies, may tend to perfect it, by bringing forward the names and opinions of authors now unnoticed.

When the true relation of fossils to the strata containing them had been established, and the action of still existing causes recognized in some of the effects most remote from them, geology emerged effectually and finally from its obscurity, and it has since exhibited in its votaries a happy union of accurate observation and detail, and of profound philosophical generali-

zation, not surpassed in any other science. Here we may pause, as the works of living geologists are fresh before us; and though the illustrious Cuvier has quitted this earthly scene, the monument of his success and of his glory remains in so perfect a state, that we can scarcely imagine that the hand even of its author could have added to or improved it. (Page 85) "The "establishment from time to time of numerous points of identi-"fication drew at length from geologists a reluctant admission, "that there was more correspondence between the physical "constitution of the globe, and more uniformity in the laws "regulating the changes of its surface from the most remote "eras to the present, than they at first imagined." Yet they were far from conceding, that the intensity of action, of causes, formerly as now existing, was constant. They still considered it possible to trace exhibitions of greater violence at former periods, and we may, therefore, look upon our author as the founder of a new school, where he maintains an absolute "uniformity in the order of nature." It is now our object to examine his theory, to estimate the value of his reasonings, and to judge how far they are reconcileable with the inductions of sound philosophy.

To establish an absolute uniformity in the order of nature, meaning thereby an identity between ancient and modern forces, both of kind and degree, it is necessary to compare the changes now in progress with the accumulation resulting from the action of ages, and to estimate the true relation between them. For this inquiry and comparison, our situation, occupying as we do only a point on the earth, and commanding by our external senses only a limited portion of its surface, is unfavourable, and we, therefore, are much indebted to Mr. Lyell, for laying before his readers, an accurate and detailed delineation of those varying features of nature, which, from distance or obscurity might have either escaped notice, or have been imperfectly appreciated. Who is there, for instance, who at some one time or place, has not seen the waves of the ocean beating against, and shaking down the rocky barriers of the coast, or sweeping away the looser materials of the shore? And yet how many who suspect not the amazing amount of their collective devastations, which may be traced in our author's pages: at page 266 we read that "in the old maps of Yorkshire, spots, "now sandbanks in the sea, are marked as the ancient sites of "the towns and villages of Auburn, Hartburn, and Hyde. Of "Hyde only the tradition is left; and near the village of "Hornsea, a street, called Hornsea Beck, has long since been "swallowed. Owthorne and its church have also been in great "part destroyed; and the village of Kilnsea. The rate of

" encroachment at Owthorne, at present, is about *four yards a* " *year.*" (Page 268,) " Between the years 1824 and 1829, no " less than seventeen yards were swept away at Sherringham, " and only a small garden was then left between the new inn " and the sea. There is now a depth of twenty feet (sufficient " to float a frigate) at one point in the harbour of that port, " where, only forty-eight years ago, there stood a cliff fifty feet " high with houses upon it." The fates of many other villages which have gradually sunk into the abyss, tell the same story; and if their tale be too simple, though, indeed, the coffins and skeletons of the churchyards of Dunwich, exposed to view in the sea cliffs, are an accompaniment sufficiently striking and emblamatical: we shall find by going further from home, others replete with horrors; such, for instance, as that of (page 290) " Northstrand, which, up to the year 1240 was, with the islands " Sylt and Fohr, so nearly connected with the main land, as to " appear a peninsula, and was called North Friesland; a highly " cultivated and populous district. It measured from nine to " eleven geographical miles, from north to south, and from six " to eight, from east to west. In the above mentioned year, it " was torn asunder from the continent, and in part overwhelmed. " The isle of Northstrand, thus formed, was, towards the end " of the sixteenth century, only four geographical miles in cir- " cumference, and was still celebrated for its cultivation and " numerous population. After many losses it still contained " nine thousand inhabitants. At last, in the year 1634, on " the evening of the 11th October, a flood passed over the " whole island, whereby 1300 houses, with many churches, " were lost; 50,000 head of cattle perished; and above 6,000 " men. Three small islands, one of them still called North- " strand, alone remained, which are now continually wasting."

Whilst the heavy waves of the sea are thus attacking the land at its base, the mountain torrents, springing, as it were from the clouds, begin their work of destruction at the very summit, and uniting, as they go, into the more copious streams of rivers, and swollen by occasional storms of rain, and by the melting of snows, they tear up and bear away, even unto the ocean, large quantities of earthy matter: thus, (page 292) " Captain Sabine found that the sea was discoloured by the " waters of the Amazon, at the distance of not less than three " hundred miles from its mouth, where they were still running " with considerable rapidity in a direction inclined to that of " the equatorial current of the ocean." The hardest rocks too give way under the constant erosive action of the waters, assisted by the friction of substances moving along with them. In this way, lavas, the age of which is known, have been cut

through by the streams, which, when first erupted, they had dammed up, as in the case of the Simeto, formerly obstructed by a stream of lava from Etna. (Page 178) "Gemmelaro gives "the year 1603 as the date of the eruption. The appearance "of the current clearly proves, that it is one of the most modern "of those of Etna, for it has not been covered or crossed by "subsequent streams or ejections; and the olives on its surface "are all of small size, yet older than the natural wood on the "same lava. In the course, therefore, of about two centuries, "the Simeto has eroded a passage from fifty to several hun-"dred feet wide, and in some parts from forty to fifty feet "deep. The portion of lava cut through, being in no part "porous or scoriaceous, but consisting of hard blue rock, some-"what lighter than ordinary basalt, and containing crystals of "olivine and glassy felspar." The recession of the falls of Niagara, though equally illustrative of the wearing powers of water, evinces it in another form, for there the soft shale below, is, as it were, dissolved out by the spray proceeding from the bottom of the falls, and the hard limestone above being left without support, breaks off from its mere weight; a mode of wear, first, we believe, explained correctly in 1818, by Doctor Mitchell, of New York, in his edition of Cuvier's Theory of the Earth, and subsequently adopted by Captain Hall and other writers.

Well may we, contemplating such incessant destruction, in such various shapes, feel the very ground beneath us insecure. Yet if it should escape from us, other resting-places for our feet are preparing. The ruins of cliffs, beaten down by the waves, and gradually reduced by their incessant action into minuter fragments; and much of the lighter earth or mud, brought down by rivers, are either spread out by the tides, or wafted away by currents, to be again deposited as banks in other places; sometimes forming additions to the present land, as on parts of the Syrian shores, where (page 308) "the ruins of ancient "Tyre are now far inland, and those of ancient Sidon, are two "miles distant from the coast." Or, on the coast of America, where "the sediment of the Amazon is constantly carried to "the north-west, as far as to the mouths of the Orinoco; and "an immense tract of swamp is formed along the coast of "Guiana, with a long range of muddy shoals bordering the "marshes, and becoming converted into land." And at others, carried into the deeper waters, and there formed into long continuous banks, such as the great banks of Newfoundland; or those of the German Ocean, the greatest of which, (page 307), "the Dogger bank, extends for upwards of 354 miles from "north to south," whilst the superficies of the whole "is equal

"to about one-fifth of the whole area of the German Ocean: or "to about one-third of the whole extent of England and Scot- "land;" or, lastly, those which skirt our own island, and, like the rest, may be considered germs of new islands and continents. The direct effect, also, of rivers in filling up with alluvial matter the lakes through which they pass, in shallowing small bays and seas into which they enter, and extending the land by deltas, has been and is still very great. The Rhone has thus pushed forward the land, so that (page 233) "Notre "Dame des Ports, which was a harbour in 898, is now a "league from the shore. Psalmodi, which was an island in "815, is now two leagues from the sea; and several old lines of "towers and sea-marks occur at different distances from the "present coast, all indicating the successive retreat of the sea, "for each line has, in its turn, become useless to mariners, "which may well be conceived, when we state that the tower "of Tignaux, erected on the shore, so late as the year 1737, is "already a French mile from it." The Po, under a great combination of favourable circumstances, has made still greater progress, as (page 236), "Adria, which was a seaport in the time "of Augustus, and had in ancient times given its name to the "gulf, is now about twenty Italian miles inland." "Ravenna, "which was a seaport, is now about four Italian miles from the "main sea," and "Spina, a very ancient city, originally built "in the district of Ravenna, at the mouth of a great arm "of the Po, was, so early as the commencement of our era, "eleven Italian miles distant from the sea." Egypt, too, was supposed by her priests, to be the gift of the Nile; and many more recent proofs of the continued bounty of that celebrated river, are adduced in the situation of the cities Damietta, Rosetta, Foah, &c. And if we turn to the mighty Ganges, we find in its Delta, (page 241), "the base of which is 200 miles in length;" and in the numerous islands constantly forming other (page 243) "remarkable proofs of the immense transportation of earthy matter;" which may be further illustrated by (page 241) "the fact, that so great is the quantity "of mud and sand poured by the Ganges into the gulf in the "flood season, that the sea only recovers its transparency at the "distance of sixty miles from the coast."

Our author has thus placed before us ample examples of the continued wear of existing lands, and of the gradual accumulation of the materials carried off in alluvial flats, or in banks; but as yet we see in them only heaps of loose gravel, sand, or mud, and consolidation is necessary to reduce them into rocks. Whether, indeed, the larger portion of these deposits will ever be thus hardened is extremely doubtful; and it is only on the

principle that no alteration has taken place in the state of natural forces, that we find it necessary to inquire how far the causes at present in action could have reduced ancient debris into solid strata, and consequently, be equally efficient to do so now. The Huttonian doctrine of a sufficient central heat by which the particles of strata were presumed to be agglutinated together, and the gradual diminution of that heat maintained by Cordier and others, from which it might become incapable of effects ascribed to it at former epochs, Mr. Lyell equally rejects; and he, therefore, seeks his chief agent in infiltrations and chemical deposition. (Page 476), "The circumstances are, in truth, more "complicated than those before stated; for, independently of "the transfer of matter by running water from the continents to "the ocean, there is a constant transportation of mineral ingre- "dients from below upwards by mineral springs and volcanic "vents. As mountain masses are, in the course of ages, created "by the pouring forth of successive streams of lava, so others "originate from the carbonate of lime and other mineral ingre- "dients with which springs are impregnated." (Page 198), "The number of metals, earths, acids, alkalies, held in solu- "tion by different springs, comprehends a considerable portion "of all known substances," and (page 200), "we might divide "the consideration of springs, like that of rivers, into their de- "stroying and reproductive agency; but the former class of "effects being chiefly subterranean, are beyond the reach of "our observation, while their reproductive power consists "chiefly in augmenting the quantity of matter deposited by "rivers in deltas, or at the bottom of the sea." And in reference to the carboniferous series, (page 127), "These isles were "composed partly of primary and partly of volcanic rocks, "which, being exposed to the erosive action of torrents, to the "undermining powers of the waves beating against the cliffs, "and to atmospheric decomposition, supplied materials for "pebbles, sand, and shale, which, together with substances in- "troduced by mineral springs, and volcanos in frequent erup- "tion, contributed the inorganic parts of the strata." As examples, we read that (page 204) "a hard stratum of stone, "about a foot in thickness, is obtained from the waters of San "Fillipo in four months," and that, "the mass which descends "the hill, which is a mile and a quarter in length, and half a "mile in breadth, attains in some places a thickness of 250 "feet, offering too in the spheroidal forms which it assumes, a "striking analogy to those of the English magnesian limestone "of Sunderland." (Page 208), "At Tivoli, in the sides of the "deep chasm into which the cascade throws itself, there is

" seen an extraordinary accumulation of horizontal beds of tufa " and travertin from four to five hundred feet in thickness." And, (page 211), " in the marshes of the great plains of Hun-" gary, horizontal beds of travertin, including recent fresh water " shells, are continually deposited, and are sufficiently solid " to serve for building-stones, all the houses of Czeled being " constructed of this material." (Page 213), " The hot springs " of Valle das Furnas, in the island of Saint Michael, rising " through volcanic rocks, precipitate vast quantities of siliceous " sinter, the more abundant variety occurring in layers from a " quarter to half an inch in thickness, accumulated on each other, " often to the height of a foot and upwards, and constituting " parallel, and for the most part horizontal, strata many yards " in extent." " A recent breccia is also in the act of forming, " composed of obsidian pumice and scorie, cemented by sili-" ceous sinter." " The constant flow of mineral waters, even " when charged with a small proportion of silica, as those of " Ischia, may supply certain species of coral and sponges with " matter for their siliceous secretions; but, when in a volcanic " archipelago, or a region of submarine volcanos, there are " springs so saturated with silica, as those of Iceland and the " Azores, we may expect beds of chert, or layers and no-" dules of silex to be spread out far and wide over the bed of " the sea, and interstratified with shelly and calcareous deposits, " which may be forming there, or with matter derived from the " wasting cliffs, or volcanic ejections." Ferruginous springs have also their action, and (page 214) " it is a fact familiar to " all, that many of them are so copiously impregnated with iron, " as to stain the rocks or herbage through which they pass, and " to bind together sand and gravel into solid masses; and " when we find, therefore, that so many sandstones and other " rocks in the sedimentary strata of ancient lakes and seas are " bound together or coloured by iron, it presents us with a " striking point of analogy between the states of things at very " different epochs."

Having now given a sketch of our author's views respecting the destructive and reproductive powers of aqueous agents, we shall pause to inquire how far an exhibition of effect has been brought forward sufficient to account for the formation of ancient rocks. As regards the space which alluvial depositions or sand-banks occupy, there can be no difficulty, as it is in many cases so considerable, that formations, quite as extensive as many of those of the present land, might be expected to originate in them. It is rather in the means of their consolidation that we suspect an insufficiency of cause. Where, for

instance, are we to look for a fitting type of those vast beds of conglomerate which often rest on equally remarkable masses of solid sandstone; for, though we might admit, that the depositions of calcareous and ferruginous springs were sufficient to explain the formation of limestones and slightly coherent sandstones, can we equally allow that the instances adduced of siliceous depositions from the heated springs of volcanic districts are commensurate with the immense quantity of silex which must have been consumed in cementing the greywackes, the older sandstones, and some of the ancient conglomerates, the strata of which are also so frequently traversed with numerous contemporaneous veins of white quartz, that their occurrence has been given by Brongiart as one of the characteristics of the deposit.

It is true, that as on the land, so there may be many submarine springs, and volcanic vents, replete with mineral exhalations, yet seeing no reason for supposing them so extensively diffused, as the consolidation of the great sand banks would require, or even proportionably more in number than on the land, we cannot look for greater effects from their operation. To us, then, the existence of a greater solvent power in the ancient ocean, whether arising from its higher temperature, or from the presence of acids (the fluoric for instance) or alkalies, since deposited, seems unavoidable, unless we adopt the Huttonian principle, of consolidation by heat. To heat there are powerful objections as a sole agent, since its great intensity must have been incompatible with the existence of organic beings, many of which appear to have lived and died where they are now found encased in stone; whilst in the first hypothesis we can discover nothing unphilosophical or inconsistent with ordinary phenomena, as it merely implies such an alteration in the waters of the ocean, as the deposition of substances, not fictitious, but present in nature, or the moderate diminution of temperature, which observation forces even Mr. Lyell to admit would have produced.

Our readers will observe, that as yet we have made no reference to that great catastrophe, a general deluge, traces of which, in the opinion of most geologists, are discoverable on all parts of the earth's surface; though to our author, who, even here, relaxes not his consistency, there is nothing in the appearances which may not be explained by local deluges, such as now occasionally attend the bursting of a lake, or the shock of earthquakes: (page 89) "In speculating, he says, on catastrophes by "water, we may certainly anticipate great floods in future, and "we may therefore presume that they have happened again and "again in past times." The flood in the valley of Bagnes is

given as an example. A barrier of snow and ice, precipitated, in 1818, from an elevated glacier across the bed of the river Dranse, had formed its upper portion into a lake; and though the precaution had been taken to cut an artificial gallery, so as to drain off a part of the water (page 195) "on the approach of the hot season, the central portion of the remaining "mass of ice gave way with a tremendous crash, and the residue "of the lake was emptied in half an hour. For the greater "part of its course, the flood resembled a moving mass of rock "and mud, rather than of water. Some fragments of primitive "rock, of enormous magnitude, and which, from their dimensions, might be compared, without exaggeration, to houses, "were torn out of a more ancient alluvion, and borne down for "a quarter of a mile." (Page 194) "But these catastrophes are "insignificant when compared to those which are occasioned by "earthquakes, when the boundary hills, for miles in length, are "thrown down into the hollow of a valley;" as in that of Java (1699) when (page 444) "seven hills bounding the Batavian "river, sunk down; by which is merely meant, seven great land-"slips. These hills descending, some from one side of the val-"ley, and some from the other, filled the channel; and the wa-"ters then finding their way under the mass, flowed out thick "and muddy. The Tangaran river was also dammed up by "nine hills; and seven of its tributaries are said to have been "covered up with earth." And resting on such local catastrophes, Mr. Lyell explains traditionary references to a deluge, by their effect on the alarmed minds of those who survived the attendant destruction. Humboldt records the festivals by which the Indians, gladdened by a season of extraordinary fertility, which followed the great earthquake of Cumana in 1766, "cele-"brated, after the ideas of an antique superstition, the destruc-"tion of the world, and the approaching epoch of its regenera-"tion." And our author thus reasons upon the statement, though we think that the highly figurative language of the American Indians may have given it undue importance. (Page 8), "The existence of such rites, among the rude nations of "South America, is most important, for it shews what effects "may be produced by great catastrophes of this nature, recur-"ring at distant intervals of time, in the minds of a barbarous "and uncultivated race. The superstitions of a savage tribe "are transmitted through all the progressive stages of society, "till they exert a powerful influence on the mind of the phi-"losopher. He may find, in the monuments of former changes "in the earth's surface, an apparent confirmation of tenets "handed down through successive generations, from the rude "hunter, whose terrified imagination drew a false picture of

"those awful visitations of floods and earthquakes, whereby the "whole earth, as known to him, was simultaneously devastated." Much, indeed, may be attributed to such physical and mental causes as have been adduced, though we may doubt their power to dispel the charm with which the classic writings of Buckland and of Cuvier have invested the subject, and question even their efficiency to explain some of the existing appearances. If, indeed, as our author reasons, the receding Falls of Niagara were to reach the barriers of Lake Erie, and a deluge ensue on the banks of the emptied lake, we should find evidence of the former state of things, and of the nature of the catastrophe. Where, however, are we to look for the barriers which held up the waters, the escape of which deluged existing continents? Or can we explain the transports of those long lines of boulders which have so long puzzled geologists (Deluc formerly, and Rozet now, supposing them projected from below), either by the few fragments moved by a local deluge some hundreds of yards, or by those shifted by a moving glacier, or carried along by an iceberg? We do not think that these difficulties have been fully met or solved; and at the same time, we must dissent from the principle, that before a former catastrophe can be admitted, we must be able to predict the possibility of its future occurrence; though, on the other hand, we might fairly expect a recurrence of what had once happened, unless it could be proved that the cause which produced the former effect had ceased to operate, or had diminished in energy.

Hitherto we have been considering the action of those forces by which the visible crust of the earth is gradually worn down, and its component parts carried to lower levels, there to be consolidated into new strata. And if in the varying directions of currents, occasioned by changes in the contour of the land (a projecting point being swept away here, or a bay scooped out there), we may perceive sufficient cause for an alternation along the shores, of deposits of sand, with the organic relics of tranquil animal life, the same locality being at one time exposed to the sweeping course of the marine stream, and at another, removed from its influence; in the still greater masses deposited in the deep sea, we shall no more expect to find such relics, than we do in the similar masses of ancient sandstone. Thus far, then, the identity is complete; but on the present land, the operation has been extended one step further, and the beds of ancient seas and lakes have become dry ground, inhabited by animals, whose organization admitted not their existence in the waters which once were there. In accounting for this alteration of level, and for the inclined position of many of

the strata, geologists have differed widely in opinion ; some, as Hutton, advocating an elevation of the land by subterranean forces ; others, like Deluc, a subsidence of the ocean and a tilting up of the strata by the breaking up of the caverns of the deep. And even now that the principle of elevation has been most generally adopted, there exists, as of old, an equal contrariety in the modes proposed for effecting it. The expansive force of steam, generated by the contact of water with the heated nucleus of the earth ; the intense heat and developement of gases, arising from the contact of water, at a great depth below the surface, with the metallic bases ; and Cordier's theory of a greater contraction in the solid crust than in the still melted central mass of the earth, producing compression of the latter, have all obtained adherents. To adjust their respective claims is not our present object, and still less to advance our own speculations (though we are tempted to advert to the possible effects of alterations in the direction of electric currents, which are, in some degree, pointed out by the corresponding changes in that of the magnetic meridian), but simply to examine our author's position, that the energy of the force of earthquakes, as well as "the power of volcanoes to emit lava," have remained unimpaired, and are now as capable of uplifting strata, or of pouring out melted matter, as at any former epoch, a position at variance with the opinions of most geologists, who, whilst they (page 478) " contend for the analogy of the effects of earth-" quakes in ancient and modern times, have, nevertheless, de-" clared that the energy of the force has considerably abated."

It would be vain to attempt to infuse into our pages even a moderate portion of the deep interest with which the nine chapters, treating on this part of the subject, must be read by every one. We can only, therefore, choose a few examples from the ample catalogue of fearful catastrophes ; and we shall rather select those which most illustrate the point in question, than others, which, from their accompanying horrors, and the awful destruction of human beings attending them, might have arrested more powerfully our attention. The story of Herculaneum and Pompeii is so familiar to all, that it needs no further comment. In the island of Ischia a well authenticated eruption occurred in 1302. (Page 333), " During the greater part of 1300, earth-" quakes succeeded one another with fearful rapidity, and they " terminated at last with the discharge of a lava stream from a " point named Campo del Arso, not far from the town of " Ischia. This lava ran quite down to the sea, a distance of " about two miles. In colour it varies from iron-grey to reddish-" black, and is remarkable for the glassy felspar which it con-" tains. Its surface is almost as sterile, after a period of five

"centuries, as if it had cooled down yesterday." (Page 338), "In December, 1361, seven streams of lava poured at once "from the crater of Vesuvius, and overflowed several villages "on the flanks and at the foot of the mountain. Resina, partly "built over the ancient site of Herculaneum, was consumed by "the fiery torrent. Great floods of mud were as destructive as "the lava itself." (Page 341), "More than 800 feet of the "cone of Vesuvius was carried away by the explosions of 1822, "so that the mountain was reduced in height from about 4200 "to 3400 feet." In the eruption of Ætna, 1660, the lava, after overflowing fourteen towns and villages, some having a popula- "tion of between 3000 and 4000 inhabitants, arrived at length "at the walls of Catania. These had been purposely raised to "protect the city; but the burning flood accumulated till it "rose to the top of the rampart, which was sixty feet in height, "and then it fell in a fiery cascade, and overwhelmed part of "the city. This great current had performed a course of fif- "teen miles before it entered the sea, where it was still six hun- "dred yards broad, and fifty feet deep." But what are these, and subsequent eruptions of the same volcanos, compared with that of Skapta Jokul, in Iceland, which did not entirely cease till the end of two years, columns of smoke still rising from the lava and hot water filling the rents, even eleven years after- wards, in 1794. Nine thousand persons perished. (Page 373), "Broad lakes of fiery matter, from twelve to fifteen miles wide, "and one hundred feet deep," were formed; and the profound abyss which the tremendous cataract of Stapafoss had been hol- lowing out for ages, was filled up. And, can we give our rea- ders a finer example of the mode in which some of the basalts and ancient lavas were formed, than when in our author's words, (page 374), "we call particular attention to the extraordinary "volume of melted matter produced in this eruption. Of the "two branches which flowed in nearly opposite directions, the "greatest was fifty, and the lesser forty, miles in length. The "extreme breadth which the Skaptâ branch attained in the "low countries, was from twelve to fifteen miles; that of the "other, about seven. The ordinary height of both currents was "100 feet; but in narrow defiles, it sometimes amounted to 600 "feet."

This, indeed, is a splendid example of the production of igneous rocks; and Mr. Lyell exultingly adds, that (page 376) "it would be most difficult to point out a mass of igneous origin "of ancient date, distinctly referrible to a single eruption, which "would rival in volume the matter poured out from Skaptâ "Jokul in 1783." And yet we may hesitate to consider the

problem perfectly satisfied, when we look at those lengthened trapdykes, continuous sometimes for sixty miles, which have rent asunder the strata. They may, indeed, be the effects of the first struggles of the pent up matter, under the additional pressure of a deep ocean; but if so, surely the very removal of that pressure by the swelling up of part of the earth's crust, and the bursting open, and subsequent existence of a vent, ought to lead us to expect less condensation of vapours and of gases, and less energy of explosion. We have also to render consistent with the rest the formation of other igneous rocks, such as granite, (the discovery by Humboldt, in a recent journey, of a granite stream may here be mentioned), some varieties of quartz rock, &c.; and in calling to our aid, pressure, we ought not to forget, that dykes have cut through rocks full of the remains of animals, which, in all probability, inhabited water of no very great depth, and as probably, lived and died near, or on the spot, where they are now found. Are we, then, to suppose these strata plunged to a lower level, that they may be torn asunder and again uplifted? The appearance of new islands in shallow seas, few of which survive long the catastrophe which produced them, the greater portion, like that of last year in the Mediterranean, sinking again into the deep whence they had issued, is a pleasing illustration of the uplifting power of earthquakes. And others, more striking, may be adduced, as in the case of Jorulto, in Mexico, in 1759, when (page 376) "six volcanic "cones, composed of scoriæ and fragmentary lava, were formed "in the line of a chasm, which ran in the direction from N. N. E. "to S. S. W. The least of these cones was three hundred feet "in height, and Jorulto, the central volcano, was elevated one "thousand six hundred feet above the level of the plain." Or, in the destructive earthquake which visited the coast of Chili, on the 19th November, 1822, when (page 401) "the shock "was felt simultaneously throughout the space of one thousand "two hundred miles, from north to south; and St. Jago, Val-"paraiso, and some other places, were greatly injured. When "the district round Valparaiso was examined in the morning "after the shock, it was found that the whole line of coast, for "the distance of above one hundred miles, was raised above its "former level. At Valparaiso, the elevation was three feet, and "at Quinleso, about four feet; and part of the bed of the sea "remained bare and dry at high water, with beds of oysters, "muscles, and other fish, adhering to the rocks on which they "grew." And Mrs. Graham observed, that, (page 403,) "be-"sides the beach newly raised above high water, there were "several older elevated lines of beach, one above the other,

" consisting of shingle mixed with shells, extending in a parallel " direction to the shore, to the height of fifty feet above the " sea."

These are fitting specimens of the energy of subterranean forces, which seem to trumpet forth in thunder some of their operations, for, (page 403), " the sound of the explosion of " Tomboro, in the island of Sumbawa, was heard in Sumatra, " at the distance of 970 geographical miles in a direct line ; " and at Ternate, in an opposite direction, at the distance of " 720 miles." And we shall leave the reader to judge for himself, how far the frequent repetitions of shocks, equal in intensity to those here described, may, foot by foot, have raised the Andes, Himalaya, and the Alps, to their present towering height, or have elevated marine strata to various heights; (page 387), " sometimes to move them 10,000 feet above the level of " the sea ; sometimes in horizontal tabular masses; in other " cases, with every degree of inclination, from the horizontal to " the vertical." It is enough for us to concede the great analogy in the mode of action at various epochs, which may be discovered in all parts of the earth's surface ; and we shall conclude this part of our observations, by remarking, how thin the partition is which separates our author from the advocates of a central melted nucleus. For, if we consider the five European volcanos " to constitute about a fortieth part of those already " known in the globe ;" and that, (page 397) " the loftiest vol-" canic cones may be as insignificant, when contrasted with the " products of fire in the nether regions, as are the deposits " formed in shallow estuaries, when compared to submarine " formations accumulating in the abysses of the ocean." If we admit the identity of hot springs with volcanic phenomena, suggested in the memoirs of the Academie Royale, even so far back as 1699, where, in reporting upon a communication of M. Diéulamant, respecting a burning spring in Dauphiny, the following words are used: " the physical explanation of " these facts will not be difficult, when we shall have some " idea of volcanoes. This burning terrain of Dauphiny, is " a Vesuvius or an Etna on a small scale," and, (page 396), " if we know not how many miles deep may be the ducts " which communicate between the mountain, and those subterra-" nean lake or seas of burning matter, which supply for thousands " of years, without being exhausted, the same volcanic vents." We require no great effort to break down the barriers between these scattered reservoirs, allowing them to flow into one melted film ; and if we can do this, is it not more philosophical to suppose at once the whole central mass in fusion, and more consonant to the vast extension of the shock of earthquakes, and to the

discoveries of M. Elie de Beaumont, in the elevation of mountain chains, all which seem to require a deeply seated force?

There is yet another, and even a more pleasing light, in which geology may be viewed; nay, there is something which seems beyond the sober reality of truth in the sudden appearance before us, as we gaze at the rugged and inanimate rocks of thousands of uncouth forms, which, rising from their long sleep, tell the story of other days and other worlds. The discovery of such beings excited the amazement, as it exercised the ingenuity, of early geologists; and now that more modern observers have unravelled these hieroglyphics of nature, we have, on every side of us, tablets of stone, on which are recorded the acts of creative wisdom. To them we may refer when a link in the order of beings seems wanting; and from them we may learn a history so passing strange, that it might well be told as of enchantment. The first great truth which bursts upon us is, that in retiring back to these ancient times, we are no longer exposed to the chills of a northern climate, but every thing around us, whether it be animal or vegetable, speaks of warmer regions. This admitted, the geologist is required to explain by what influence the alteration of climate has been effected; and here we shall inquire how far our author has been successful in bringing so great and remarkable a change within the operation of forces now in action; and in dispensing with every extraneous cause, such as a shifting in the position of the earth's axis, or a great internal and gradually decreasing heat; which last alone, as a theory, can with any chance of success engage in the contest. So evidently is the internal heat of the earth, connected with volcanic phenomena, either as cause or as effect, that were the one supposed to have possessed at any former epoch, greater intensity, the other must be admitted to have varied with it. Mr. Lyell, as we have seen, denies any diminution in the energy of volcanoes, and consequently, he, in like manner, contends for constancy in the sources of internal heat. To elevations, then, and depressions of the surface of the land, already demonstrated to have occurred, he refers alone for an explanation of changes of temperature. And in the whole of this able work, there is not, perhaps, a more ingenious chapter than the seventh, in which this proposition, the test, we may almost say, of the correctness of his general principles, is maintained. The two following passages may be taken as an enunciation of the theory. (Page 106), "The ocean has "a tendency to preserve every where a mean temperature, "which it communicates to the contiguous land, so that it tem-"pers the climate, moderating alike an excess of heat or cold. "The elevated land, on the other hand, rising to the colder

"regions of the atmosphere, becomes a great reservoir of ice "and snow; attracts, condenses, and congeals vapour, and com-"municates its cold to the adjoining country. For this reason, "Greenland, forming part of a continent, which stretches north-"ward to the 82° of latitude, experiences, under the 60th pa-"rallel a more rigorous climate than Lapland, under the 72nd." And, (page 107,) "if land be situated between the 40th paral-"lel and the equator, it produces exactly the opposite effect, "unless it be of extreme height, for it then warms the tracts of "land or sea that intervene between it and the polar circle. "For the surface being, in this case, exposed to the vertical, or "nearly vertical rays of the sun, absorbs a large quantity of "heat, which it diffuses by radiation into the atmosphere. For "this reason, the western parts of the old continent derive "warmth from Africa, which, like an immense furnace, says "Malte Brun, distributes its heat to Arabia, to Turkey in Asia, "and to Europe. On the contrary, Asia, in its north eastern "extremity, experiences in the same latitude, extreme cold; "for it has land in the north, between the 60th and 70th parel-"lel; while to the south it is separated from the equator by the "north Pacific." And in conformity to these principles, Mr. Lyell proposes to freeze and scorch the world alternately; in the one case to freeze by thrusting up extensive new masses of land towards the poles; sinking, at the same time, those at the equator, and, therefore, at once accumulating fresh quantities of ice and snow, which would float in bergs towards the equator, and diminishing the warm currents of air and water, now flowing thence toward the poles. And in the other case, by sinking land at the poles, and raising (though not to a great height) extensive tracts about the equator, to produce the very opposite effect. That such changes in the relative position of land and sea would occasion an alteration of temperature, cannot be denied; and when we consider the actual fact, as far as the elevation of the present land from beneath the ocean, is from its organic contents demonstrated, we must allow to our author great advantage over the advocates of increased central heat; the chief proof of which doctrine is to be found in the very fact they wish to explain by it. Inclined too, as we are, to consider a heated central mass as reasonable, we must still observe, that until greater extension has been given to experiment, the increase of heat perceived on descending into caves or into pits, or which was felt in the waters of the springs which flowed up after the recent deep borings made for water in several parts of France, might be ascribed to the proximity of volcanic reservoirs. Mr. Lyell's theory, however, admits of mathematical investigation;

and as Baron Fourier thought such a subject worthy of his attention, we shall venture to suggest to Mr. Hamilton, (whose mathematical powers are fully equal to any task,) the examination of these doctrines, and the solution of the problem, "what "degree of cold or heat would attend any given changes in the "relative positions of land and sea?" Contenting ourselves at present with the demonstrated fact, that the temperature of the surface of the earth has been changed, and that many of the organized structures common upon it at former epochs have disappeared, we shall take a rapid survey of the opinions which have hitherto been built upon, or supported by these acknowledged truths. Some have sought to find, in the absence of what they considered the higher orders of animals, a new argument for the notion, that the various forms of animal and vegetable life have been produced in a regular gradation from the most simple to the most complex. But against this our author contends with great force in his ninth chapter, and points out, that it is not on the bottom of the ancient sea, (and such our present land was,) that we should look for large land animals. If we want to see them, and certainly there might have been some such, as strange and vast in proportion as some of the sauriens, we ought to walk the bottom of the present ocean, and, perhaps, in some yet unclosed cavern, we might discover the monster in his den. This is a fair view of the animal part of the subject, and we must fully agree with our author, that as under similar circumstances now, the same analogous vegetable forms either predominate or diminish, as the case may be, it is more reasonable to suppose, that nature, in all its parts, was as perfect then as now. So limited, indeed, are the vital functions of plants, that we may, perhaps, hesitate to give pre-eminence to any one, and the more so, when we reflect on the obscurity in which some are yet shrouded; even allowing such superiority, since the same climate is equally adapted to the same regulation now as then, if nature has acquired new powers by experience, she is so regardless of their value as to throw them away without a sigh. And even as to animal forms, we have no certain rules to guide us; the discoveries of late years, in the molluscæ, and more recently by microscopic observations, in beings of a still lower order, having shewn that those very points of organization which appear at one time peculiar to animals of exalted, may afterwards prove common to them and others of a far more humble nature. We see, then, in the organic relics of former life, which the stubborn rocks give up to us, proofs only of the continued harmony of nature; the earth, the atmosphere which surrounds it, and the living creatures

which spread animation over its surface, being at all times in mutual and fitting relation to each other, and not evidences of the principles which regulated their creation.

But the subject may be considered differently; and instead of a series of successive and improving creations, we may imagine, with Lamarck, that there were certain original types, which, under the influence of external and internal causes, have been gradually modified into the organic structures we now behold; passing on the way, according to St. Hilaire, through those of the fossil world. And, as Mr. Lyell observes, (vol. ii., p. 2,) "If these doctrines be tenable, we are at once presented with a "principle of incessant change in the organic world, and no de-"gree of dissimilarity in the plants and animals which may have "formerly existed, and are found fossil, would entitle us to "conclude that they may not have been the prototypes and "progenitors of the species now living." Even were this doctrine tenable, and it is considered so by many German and French naturalists, we do not see that the geological question would be affected by it; for if, as Lamarck supposes, (vol. ii., p. 7,) "Every considerable alteration in the local circumstances "in which each race of animals exists, causes a change in their "wants, and these new wants excite them to new actions and "habits;" and then "these habits, its manner of living, and "those of its progenitors, have in the course of time determined "the form of its body, the number and condition of its organs, "in short, the faculties which it enjoys," so that "otters, bea-"vers, water-fowl, turtles, and frogs, were not made web-footed "in order that they might swim; but their wants having at-"tracted them to the water in search of prey, they stretched out "the toes of their feet to strike the water, and move rapidly "along the surface." The effects of changes in the earth's surface would have remained the same; and if increase of temperature is now seen to be accompanied by peculiar animal forms, or by an increase of size in the same forms, we may on this principle, as well as any other, conclude that the same circumstances would have brought about the same results at former epochs. Whether, therefore, it be admitted or not, the records of geology, and the reasonings founded upon them, remain unshaken. In itself, the inquiry is deeply interesting, and yet after every attempt to unveil nature in her operations, how little have we been able to discover: for if we suppose, with St. Hilaire, that a strict analogy may be traced through all the members of the animal world, and that one has flown progressively from the other, what is it but to consider that the Creator imbued the first simple body with the principles of all the successive stages of

life; that it was, in fact, the fœtus of the creation. And were this the case, ought we not, in the progressive developement of the natural ovum, and its advance to the more perfect form which its parent had then attained, to find some traces of all the intermediate steps? How many modifications also are there of organization which seem quite independent of corresponding changes of habit; such, for instance, as the position of the nostrils of the quadrumanous animals, lateral in those of the new, inferior in those of the old world. And how are we to account for the different direction of developement, (as it will be scarcely contended that the air was tried first, and then the water,) unless by a peculiar and immediate impulse, which would require a presiding intelligence, or by a peculiar adaptation to receive the impression in a peculiar way, implying original intention; and in either case it seems but a shifting of our point of view; for how little is the amount of creative power affected, whether we imagine that each species was formed originally as it now is, or that some simple type was first adopted and imbued with capabilities of extension into all others.

The arguments which have been drawn from the difficulty of discriminating species, we consider of little force, as there is no reason, when in the inorganic world a small, though definite difference of compound, produces a distinct definite form, that we should not admit an equal approach, and yet distinctness in the definite forms of the organic world; and those drawn from the propagation of hybrids exemplify how small is our real acquaintance with the laws of the succession of living beings. They shew us that force may indeed alter the natural display of affinities; but, if "distinctness of analogous races be found in the wild state," they have the principle of original formation with those affinities untouched. (Vol. ii. p. 35,) "They afford no ground for questioning the instability of species, but rather the contrary; they present us with a class of phenomena which, when they are more thoroughly understood, may afford some of the best tests for identifying species, and proving that the attributes, originally confined, endure so long as any issue of the original stock remain upon the earth." And should we believe with M. P. J. F. Turpin, that, "il y a autant de siéges vivans ou de vies particulieres, qu'il y a de molécules, de globules, de fibres et de membranes dans la masse composée et organique," it is merely that we suppose the compound structures to have been created out of living, rather than out of dead matter. The effects of alterations in the form, position, and elevation of the land, on organic beings, either directly by "promoting or retarding the

"migrations of species," as (page 160) "if the ocean should "gradually wear its way through an isthmus, like that of Suez, "it would open a passage for the intermixture of the aquatic "tribes of two seas, previously disjoined; and would, at the "same time, close a free communication, which the terrestrial "plants and animals of two continents had before enjoyed," or indirectly by the consequent change of climate, and the mutual action and re-action of all classes of organic beings on each other, so that what acts on one must affect all, are powerfully delineated. We may judge, for instance, what would be the consequence of an increase from favourable circumstances of certain destructive creatures, by the devastations of locusts in various countries. (Vol. ii. p. 137) "The effect of the havoc "committed by them may be estimated by the famine they oc-"casion. St. Augustin mentions a plague of this kind in Africa, "which destroyed no less than eight hundred thousand men "in the kingdom of Masanissa alone, and many more upon "the territories bordering upon the sea." Man also, though appearing last upon the stage, both by (page 152) "his di-"rect agency and by his indirect influence in multiplying "the numbers of large herbiferous quadrupeds of domesticated "races, may be regarded as one of the most obvious causes of "the extermination of species." And in addition to the numerous examples given by our author, we shall adduce one which came under our own notice: prior to the late war, the large island in Lake Erie, called Put-in-Bay Island, was remarkable for an abundance of rattlesnakes, and visited, in consequence, by every passing traveller who wished to signalize himself by the destruction of one of those dangerous reptiles. On the first alarm of approaching war, some of the farmers of the adjacent shore, landed on the island, their hogs; and by the return of peace, the whole island was stocked with pigs, whilst, alas! the rattlesnakes had been exterminated by their voracious enemies.

A strict analogy is to be observed, also, in the action of organic causes at distant and various epochs in the same way as it has been traced in that of inorganic causes; for if we have been surprised at the vast assemblages of the cells of zoophytes displayed by ancient coralline limestones, we may find equally amazing exhibitions of their present labours, as in the (page 285) "chain of coral reefs and islets, called the Maldivas, "situated in the Indian Ocean, to the south-west of Malabar, "which form a chain, four hundred and eighty geographical "miles in length, running due north and south. It is com-"posed throughout of a series of circular assemblages of islets,

" the larger groups being from forty to fifty miles in their " longest diameter." And as a link between the more distant and recent periods, exhibiting that change of climate, attested by all other geological phenomena, we may mention the discovery by Captain Bayfield of old coral reefs in the Gulf of Saint Laurence.

Here we might stop, convinced that this volume will, by every lover of the study of nature, be read with delight; but so important is the subject of fossils, as connected with geology, that we shall, in a few parting words, consider some of its bearings. Explaining the past by the present, we must admit that former depositions were local as those of our own times are. And in like manner that animal and vegetable remains must have been regulated by climate. At this moment, depositions of coal are probably preparing in the woody spoils of regions, so different in climate, that the relics of their now animate inhabitants, if hereafter found associated with the coal strata, will tell, as fossils are interpreted, of different epochs. This difficulty, as respects the identity of the fossils in ancient coal strata, is partly met by the supposition of an arrangement of islands and a similarity of temperature. That there must have been the latter cannot be doubted; but is not the former quite opposed to all the examples of accumulations of wood at the mouths of great rivers, given in the work itself; and to the vast quantities which must have contributed to our coal deposits. And in other parts of the geological series we must either suppose that all points of the earth, as yet geologically known to us, were cooled down by equal degrees; or with Humboldt, that different portions may have come successively under the same organic climate. It is evident, then, that caution is necessary in extending the application of organic remains, as a test of age, to distant countries, an opinion which was violently assailed when recently advanced by Dr. M'Cullogh, but which has, I observe, been again put forward by M. Rozet. We shall now conclude, and in turning from the pages of these able and truly philosophical volumes, we cannot deny ourselves the expression of unmingled satisfaction. Our author has ranged himself against the most able naturalists of the day, for in the lists opposed to him are Cuvier, and the principal geologists of France and England. Is it not, then, a triumph that he has maintained his ground? That he has succeeded in establishing the principle of perfect uniformity we may fairly doubt, when we reflect on that amazing change which followed the secondary strata, as, according to M. Deshayes, not one fossil shell of that period was specifically analogous to those now living, or even to the

fossils of the tertiary strata. Yet, enough has been proved to convince us, that many of the most remarkable alterations in the earth's surface, and in its inhabitants, were produced by means similar to those employed by nature to this very hour. Faint, indeed, has been our analysis of the able reasoning and well-chosen facts by which this demonstration was effected ; but we trust that it may have awakened a desire in some to drink of the copious and fresh flowing stream, to the fountain of which we have only pointed.

SCIENTIFIC INTELLIGENCE.

CHEMICAL SCIENCE.

On the transformation of Hydrocyanic Acid, and of the Hydrocyanates into Ammonia and Formic Acid, by M. Pelouze.—Anhydrous hydrocyanic acid, prepared by the process of Gay Lussac, was put in contact with about an equal volume of fuming hydrochloric acid. At the end of four or five minutes, the liquor settled into a crystalline mass, producing a very sensible disengagement of heat. This mass, when distilled, totally volatilized, and gave successively hydrocyanic, hydrochloric, and formic acid, and finally, hydrochlorate of ammonia. M. Pelouze detected the formic acid by the property possessed by the liquid portion of the distilled matter, of giving out carbonic acid when heated with red oxide of mercury. The mercury, in place of being reduced to the metallic state, as happens with pure formic acid, existed as protochloride, in consequence of the metal, at the moment of its reduction, converting the per into the protochloride, as M. Pelouze satisfied himself by experiment.

Sulphuric acid gave rise to a re-action similar to that produced by the muriatic acid, but with more difficulty and less rapidity.

Having ascertained this fact, the deficiency of product generally met with in the preparation of prussic acid could be easily explained.

An atom of cyanuret of mercury was decomposed by an atom of fuming muriatic acid, the strength of which had been previously ascertained by its saturating power. An atom of hydrocyanic acid and one of corrosive sublimate, were obtained, but no formic acid or ammoniacal salt. But when an excess of hydrochloric acid was employed, this excess meeting hydrocyanic acid and water, gives rise to the formation of formic acid and muriate of ammonia, which, entering into combination with the bi-chloride of mercury, formed the double salt (sal alembroth), and but a small portion of prussic acid was obtained.

These experiments shew, that it is very necessary to avoid any excess of hydrochloric acid when preparing hydrocyanic acid by the mode of Gay Lussac, as the low price of that acid and the high price of cyanuret of mercury might induce one to make use of.

When a concentrated solution of cyanuret of potassium is boiled for some time without the contact of the air, it is decomposed, ammonia is disengaged, and formiate of potash formed. This change is at first rapid, but afterwards goes on very slowly. If dry cyanuret is

heated to redness, without the contact of air, it is not decomposed; but if an excess of potash be present, ammonia and hydrogen gases are disengaged, and carbonate of potash remains behind.

It is curious to examine the properties of a salt which possesses the same composition as hydrocyanic acid dissolved in three atoms of water.

The formiate of ammonia is a salt, very soluble in water, white, and of a fresh and poignant taste.

When heated, it fuses completely at the temperature of 120° cent.; at 140° it gives out some ammonia, and at 180° it is decomposed entirely into prussic acid and water. Scarcely a trace of formiate escapes decomposition, when the experiment is suitably made. The product of the distillation (the prussic acid) is extremely concentrated, for it contains less than its own weight of water. This decomposition resembles very much the decomposition of nitrate of ammonia into nitrous oxide and water.

The formiate of ammonia was found not to possess any active properties when given to animals. M. Pelouze drank a solution of a drachm without any result.

It is evident that we cannot consider the prussic acid dissolved in water, as identical with formiate of ammonia; but the facility with which these substances are convertible into each other, explain why we often meet with prussic acid destitute of any medicinal properties. —*Journal de Pharmacie*, p. 173, Avril, 1832.

Preparation of Iodic Acid, by M. Liebig.—A solution of chloride of iodine is to be obtained by diffusing iodine in water, and passing chlorine through the liquor until it is no longer absorbed. The clear solution is to be then neutralized by solution of carbonate of soda; a quantity of iodine falls; more chlorine is to be then added until the precipitate re-dissolves. The solution of carbonate of soda is to be then again added, and this alternate treatment applied until no more iodine separates, when the liquor is neutralized. A solution of muriate of baryta is to be then added as long as any precipitate is produced. The white precipitate is the iodate of baryta, which is to be carefully washed on a filter and dried.

To nine parts of this precipitate are added two parts of sulphuric acid, diluted with ten or twelve of water. The whole is to be boiled for half an hour, and the sulphate of baryta is to be separated by the filter from the dilute iodic acid. The solution is to be then evaporated to a weak sirupy consistence, and left exposed to the air for many days. Very regular crystals of iodic acid form, perfectly transparent, and continually increasing in volume. The mother waters, when decanted, yield still more crystals.

When nitric or sulphuric acid is added to an aqueous solution of iodic acid, a white crystalline powder is thrown down, which was regarded as a combination of these acids with iodic acid. By the experiments of M. M. Serullas and Liebig, it has been, however, per-

fectly proved that this precipitate is pure iodic acid, containing no nitric or sulphuric acid in chemical combination. The precipitation of the iodic acid is owing to the insolubility of that acid in sulphuric or nitric acids, and also to these acids removing the water necessary for its solution.—*Journal de Pharmacie*, Avril, 1832, p. 216.

Action of Cyanogen on Sulphide of Hydrogen, by M. Wöhler.—Cyanogen and sulphuretted hydrogen are to be received in a glass vessel entirely filled with water, and frequently agitated in order to favour absorption. The water is soon coloured yellow, and abundant orange-red floculi are deposited, which, on close examination, are found to be minute crystals. This matter is thrown on a filter and washed with cold water, then dissolved in boiling alcohol, from which solution it is deposited, on cooling, in regular crystals. When this matter is gently heated, it sublimes partly undecomposed; but the greater portion becomes black, and much sulphuret of ammonium is disengaged while charcoal is deposited. It dissolves in sulphuric acid, and is precipitated from the solution by water. It dissolves in the solution of caustic potash, and may be again separated from the liquor unchanged by muriatic acid. By the aid of heat it dissolves in solutions of the carbonated alkalies, and a sulphuret and a sulphocyanuret of the base is formed. When an aqueous solution of this red substance is mixed with a solution of acetate of lead, acetic acid is liberated, and we obtain a dense orange-red precipitate, like chromate of lead, which preserves this colour if cautiously dried, otherwise it blackens, owing to the evolution of sulphuret of lead.

This matter differs from that obtained by Gay Lussac on putting cyanogen in contact with sulphuretted hydrogen. This last was very soluble in water, of a clear yellow colour, and did not enter into combination with lead. It is always produced at the same time as the other, and may be obtained by evaporating the liquor from which the red combination had separated.

The analysis was effected by determining the sulphur, by conversion into sulphate of baryta, and the cyanogen by the combustion of the carbon. The following is the result:

Sulphur	- -	50.04		6 atoms sulphuretted hydrogen
Cyanogen	-	41.11	or	6 atoms cyanogen
Hydrogen	-	3.54		1 atom of water
Oxygen	-	5.31		

It is evident that this is a hydrated hydracid, the radical of which (sulphur cyanogen) unites with the metals, so that the metals replace the hydrogen.—*Annales de Chemie et de Physique*, Janvier, 1832.

Preparation of Peroxide of Barium, by M. M. Wöhler and Liebig.—The hydrate of deutoxide of barium used for the preparation of deutoxide of hydrogen, may be easily obtained as follows: Caustic baryta is to be heated in a platinum crucible over a spirit lamp to dull redness, and small quantities of chlorate of potash are to be thrown

upon it. Incandescence ensues, and the protoxide passes to the peroxide of barium. When the mass has cooled, the chloruret of potassium is to be separated by washing with cold water, and the hydrated peroxide of barium remains as a white powder, which may be dried in the air. This hydrate appears to contain six atoms of water.

The yellow oxide of lead, fused with chlorate of potash, passes with facility into the puce-coloured oxide.—*Annales de Chemie et de Physique*, Janvier, 1832.

Composition of Cow's Milk before and after Parturition.—M. Lassaigne has recently made some important researches on the difference of composition in cow's milk previous and subsequent to parturition. The following is a summary of his results:

Forty-two days before calving, the milk was yellowish-white, sp. gr. 1063, coagulated by heat, restored the colour of reddened litmus, and contained 78.4 per cent. of water.

One thousand parts contained, cream, 200; serum, 800.

There was much albumen and free soda, but no trace of caseum, of sugar of milk, or of lactic acid.

This state continues until about eleven days before calving, when the specific gravity was only 1040; the milk was much less coagulable, and had lost its alcaline re-action. The proportion of cream and serum remained unaltered. The albumen had nearly disappeared, and the caseum and sugar of milk, with lactic acid, were found to exist.

Four days after parturition, all trace of albumen had disappeared, sp. gr. 1035; otherwise same.

The only important alteration that afterwards takes place is the gradual diminution in the quantity of fatty matter.

On the sixth day after calving, there were in 1000 parts—

	Serum.	Cream.
	812	188
20th day - - - -	922	78
30th day - - - -	936	64

—*Annales de Chimie et de Physique*, Janvier, 1832.

New Matter (Meconine) obtained from Opium.—M. Couerbe, while preparing morphia in the laboratory of Pelletier, obtained a new principle possessing the following properties:

When pure, it is white and in acicular crystals. Boiling water, ether, and alcohol, dissolve it; it crystallizes from these solutions. It melts at the heat of boiling water. When heated in a tube, it melts into a perfectly colourless liquid, then grows rather yellow, and, finally, volatilizes totally, leaving only a trace of carbonaceous residue. Distillation does not appear to change its nature.

This substance does not contain azote. It is thus distinguished

from morphia, narcotine, and narceine (another new substance found by Pelletier in opium). Its taste is very acrid; it, therefore, probably possesses medicinal properties.

In a memoir read to the Royal Academy of Sciences, M. Dublanc, jun. described a substance which he isolated from opium, but which is evidently different from the meconine of Couerbe described above. The following are its principal properties:

It is white, *tasteless*, and inodorous; crystallizes sometimes in penniform, sometimes in filliform, masses.

When heated, it melts like narcotine, and then yields *all the usual products of azotated matters*. It is insoluble in cold water, sparingly soluble in alcohol, copiously in ether.

The actions of concentrated acids characterize this substance. Sulphuric, nitric, and muriatic acids dissolve it readily, and without changing colour, and these solutions are precipitated by water, the substance re-appearing without alteration, even when exposed to the air; they crystallize all in the same manner in prismatic crystals. These crystals, when separated, do not retain any acid.

It yields more hydrogen and less carbon than narcotine. In the dose of two grains it produced no appreciable effect on man.—*Annales de Chimie et de Physique*, Janvier, 1832.

Separation of Lead from Bismuth.—M. Rusch has found that the separation of bismuth by means of water is never perfect, but that, no matter how concentrated the solution may have been, there remains always a certain quantity in the liquor. If we, then, use a sulphate for the precipitation of the lead, some sulphate of bismuth is always brought down along with it, which produces an augmentation of the weight. M. Rusch found that a small quantity of sulphuric acid had the effect of retaining the bismuth in solution, and he, therefore, proposes to precipitate the lead by dilute sulphuric acid in place of using a solution of a sulphate.—*Archiv. des Apoth. Vereins*, 1830, No. 1. p. 118.

Decomposition of Ioduret of Potassium by Vapour of Water.—The ioduret of potassium is partly decomposed, when its alcoholic solution, evaporated to dryness, is heated to redness. During this operation, carbon is deposited, and when we attempt to remove this by a protracted calcination, a basic salt is obtained. The same effect takes place when this salt is strongly heated in a flat vessel by a spirit lamp, while it is not produced if we operate in a very deep vessel. Considering these phenomena to depend on the action of water, M. Schindler passed aqueous vapour over the ioduret strongly heated, and saw that they carried away hydriodic acid, and undecomposed ioduret of potassium. He, therefore, proposes to substitute for the carbonate of potash employed generally for the preparation of the salt, caustic potash, and not to employ alcohol, by which means a

considerable loss of product is avoided.—*Geiger's Magazin für Pharmacie*, July, 1830, p. 33.

Change produced in Iron and Steel by a Solution of Nitrate of Silver.—M. Wetzlar found that iron and steel, well cleansed, when plunged during some minutes in a moderately strong solution of nitrate of silver, sufficiently acid to prevent the precipitation of the silver, and not to oxidize the iron, lose by this immersion the property of precipitating copper from its solution, but only in those portions which had been covered by the solution of nitrate of silver. These portions may be enabled to throw down copper if they be plunged into the solution, and the heterogeneous extremities of the iron or steel be put in contact either immediately or by means of a metallic wire. M. Wetzlar attributes this difference of action to this; that the iron plunged into the nitrate of silver becomes negatively electrified, while the part not immersed becomes positive; however, it acquires no trace of magnetic power.—*Geiger Magazin für Pharmacie*, January, 1830, p. 96.

On Uric Acid and the Products of its Decomposition by Nitric Acid.—The analyses of uric acid hitherto made by many eminent chemists, as Berard, Prout, Dobereiner, Braconnot, &c., disagree very much amongst themselves. In order to ascertain which of them was the least incorrect, M. Rodweiss undertook this analysis, and obtained results differing from those of all the others. The mean of his numerous experiments gave for the composition of uric acid—

4 atoms	azote	3 atoms	hydrogen
10 ——	carbon	4 ——	oxygen.

The atomic weight is therefore 153.1, and the capacity of saturation, 5.298.

M. Rodweiss then formed and examined the purpuric acid of Prout, Vauquelin, Brugnatelli, and Quesnaville. His experiments prove that the acid of Prout, carefully prepared, is really a peculiar acid, having the property of producing a red solution with ammonia, and is not, as was advanced by Vauquelin, a combination of acid and colouring matter. The acid prepared by the process of Vauquelin is really a mixture of oxalic and purpuric acids. The erythric acid of Brugnatelli is, according to M. Rodweiss, a crystallizable combination of nitric acid and of purpuric acid, and this compound is procured also by the process of Quesnaville.—*Annalen der Phys. und Chem.* 1830, No. 5. p. 1.

PHYSICAL SCIENCE.

Faraday on the Electro-magnetic Spark.—Being much engaged in the investigation and confirmation of the laws of magneto-electric

action, terrestrial magnetic induction, &c. &c. some of the results of which are contained in my second paper (The Bakerian Lecture), it will be seen that in the race which Sig. Nobili and Antinori (probably inadvertantly) ran against me (see the last paragraph of their paper), they obtained the electric spark from the common magnet before me. I have great pleasure in bearing witness to the accuracy of their reasoning on this point, and also to the success of the result. Having made a variation of the experiment by obtaining the spark from the action of a common loadstone, in which their most perfect mode could not be applied, I will take the opportunity of describing the simple adjustment I have devised. A helix was fixed round the lifter, the wire ends were raised upwards; one, which may be called *a*, was bent into a hook; the other *b*, after rising was bent at a right angle, and had a thick small circular plate of copper fixed to it, which was made by the spring of the wire to press in the middle slightly against the rounded end of *a*; this plate and the end of *a* were amalgamated. On bringing the lifter down suddenly upon the poles, the momentum of the plate caused it to separate from the end of *a*, and the spark passed. On lifting it up the concussion always separates the end of *a* from the plate, and a spark is again seen. When the plate and the point are well amalgamated, the spark will not fail once in a hundred times either at making or breaking contact. I have shown it brilliantly to two or three hundred persons at once, and over all parts of the theatre of the Royal Institution.

As Professor Ritchie expresses it, the spark has not yet been obtained except from a temporary magnet, i. e. from a magnet in the act of being made or destroyed. I obtained the first spark from a soft iron magnet made by the well-known influence of electric currents. Sig. Nobili and Antinori obtained the second spark from a soft iron magnet, made so by the influence of a common artificial steel magnet; their result has been repeated by a great number of persons. Mr. Forbes of Edinburgh first obtained the spark from a soft iron magnet, made so by the influence of the natural loadstone. The latter experiment is also that which I have made with Mr. Daniell's loadstone, lifting only about thirty pounds, and in the manner described. I was not aware of any other modes of performing the experiment except my original one, and Sig. Nobili and Antinori's.—*Philosophical Magazine, June* 1832.

Nobili on the Electro-magnetic Spark.—The relation placed at the head of this article, says "*that in a particular case Mr. Faraday had obtained a spark.*" Although this expression gave no light on the subject, and rather rendered doubtful the constancy of so extraordinary a phænomenon, we nevertheless did not suspend our researches, and have been so fortunate as to succeed beyond our hopes. The following are the theoretical views which have conducted us to this important result, but which, we fairly say, at first gave us but very little confidence.

The voltaic pile gives a spark only when composed of a certain number of pairs of plates. A single Wollaston's voltaic element yields it; and when of a certain activity produces it constantly at the surface of mercury, to which the conjoining wires destined to close the circuit are conducted. In the voltaic pile having a certain degree of *electric tension*, the sparks pass between the zinc and copper poles, either in the case of opening or of closing the circuit. In a single Wollaston's element the tension is feeble, and the spark occurs only when the circuit is interrupted. At that moment the current, which before was moving, accumulates as it were at the place of interruption, and acquires the intensity necessary to cause the spark. Such tension is wanting in the other case of closing the circuit, and the spark also is absent.

The currents developed in the electro-dynamic spirals by virtue of magnetism are also in motion, but circulate only for the moment during which they are approaching to or receding from the magnet. It was therefore, we concluded, in one of those two moments that we ought to open the circuit in making the experiment for the spark.

Thus we arranged our ideas relative to the best disposition of the electro-dynamic spirals: nothing therefore remained but to select a good horse-shoe magnet; to surround the lifter with a copper wire in the manner before described; to immerse the extremities of this wire in a cup of mercury, and to raise the one or the other extremity at that precise moment when the lifter was attached to or detached from the magnet. When two persons operate without any kind of machinery, it is more easy to lose than to catch this moment. But when the movements were simultaneous, which happened every now and then, we had the satisfaction of seeing a spark, which left nothing to be desired.

Such was the mode by which we saw the first spark: but as this beautiful result deserved to be produced at pleasure, it claimed an appropriate apparatus; and after various arrangements more or less complicated, we stopped at the following, which has the advantage of being very successful and very simple.

The whole of the contrivance is attached to the lifter of the magnet. This piece, which is a parallelopiped, is surrounded in the middle by the electro-dynamic spiral, to which it is firmly attached by two pieces of brass, so that the latter can enter between the magnetic poles whilst the lifter comes in contact with the poles in the ordinary way. The extremities of the spiral come in contact one with each magnetic pole by means of two little springs in the form of wings attached to the lifter, and which press slightly against the poles when the lifter is in its place. To leave room for these springs, the lifter is narrower than usual, covering about half the poles; the remaining space serves for the contact of the springs, which are in this way isolated as it were from the lifter; and yet by means of the magnet itself serve to complete the electro-dynamic circuit. Suppose that the lifter is in its place, the springs touch the poles, and the circuit

of the spirals is metallically closed by the magnets: on detaching the lifter, the circuit opens in two places; and either at the one or the other interruption the spark almost constantly appears. When the effect does not take place, it is because the separation has not been well effected; but it is so easy to repeat the experiment, that it is useless to think of a piece of mechanism to remedy an inconvenience which is so easily remedied.

In this apparatus the spiral on the lifter was of copper. On substituting an iron wire the spark also occurred. This experiment was interesting in illustration of any influence which the ordinary power of the magnet over iron might exert upon the electro-dynamic influence. It did not appear that the one action disturbed the other; but before positively affirming the independence, it will be necessary to obtain other proof, which we shall endeavour to do at a more favourable opportunity.—*Philosophical Magazine, June* 1832.

Nobili on the Magnetism of the Earth.—We took a paper tube two inches in diameter and four inches long, a copper wire forty metres long was coiled round it, the two ends being left at liberty to connect with the galvanometer; the tube was trimmed at the ends, so that it could be placed upright upon the table either in one direction or the other at pleasure. A cylinder of soft iron, as is well known, placed parallel to the dip is subject to the terrestrial magnetic influence; the lower part becomes a north pole, the upper a south pole. This is a phænomenon of position always occurring in the same direction with this kind of iron, which is as incapable of retaining the magnetism received, as it is disposed to receive the new magnetism to which it may be subjected.

In our latitudes the inclination of the needle is about 63°. The paper tube with its spiral was therefore arranged in that direction, and an iron cylinder introduced; whilst in the act of introducing it, the galvano-meter was seen to move, owing to the presence of an electric current excited by the magnetism. On taking out the cylinder the motion was reversed: there is no doubt, therefore, that terrestrial magnetism is sufficient of itself to develope currents of electricity. It should not be concealed here, that in the above experiment the electricity is developed by the intermedium of soft iron introduced into the spiral: this without doubt is true, but it is also true that it is not essentially necessary to recur to this aid to obtain unequivocal signs of the influence of which we speak. On placing our cylindrical spiral so that its axis should be parallel to the magnetic dip, and then inverting it by a half revolution in the magnetic meridian, we observed at the comparative galvanometer the signs of a current excited in the spiral by the sole influence of terrestrial magnetism.

It is not even necessary for this effect to place the spiral in the direction of the dip: the experiment will succeed in the vertical position; the effect is less, but always so distinct as to remove every error.

We experimented with three copper wires of different diameters, the smallest was 0·5, the second 0·66, and the third 1· millimetre in diameter. The effects increased with the size:—the first gave deviations from 2 to 4; the second from 4 to 8; and the third from 10 to 20. To obtain these great motions, we operated in the usual way of inverting the current at the most favourable moment, which is easily learned by repeating the experiment a few times.

In the present state of science this is most certainly the simplest mode of obtaining the current; all is done by terrestrial magnetism, which is every where. We purpose hereafter to study the manner of increasing the effect, and of making some useful applications, if certain apparatus which we purpose constructing should meet our wishes. The first thought is that of using it to measure the terrestrial magnetic intensity; but what precision the mode may be capable of, remains at present to be determined.

The galvanometer which should be used for the experiments of this section should be very sensible. And I repeat on this occasion what I have elsewhere said relative to these instruments: two systems may be adopted to obtain maximum effects; the one for hydro-electric currents, the other for thermo-electric currents. The galvanometer of my thermo-multiplicator is of the latter kind, and precisely that which is best in the present researches.* The reason will be evident, by observing that the new currents of Faraday are entirely developed in metallic circuits, like the thermo-electricity of Dr. Seebeck, and that, also like those of thermo-electricity, they pass with difficulty through humid conductors.—*Philosophical Magazine, June*, 1832.

BOTANY AND NATURAL HISTORY.

Temperature and Saltness of the Waters of the Ocean at different Depths.—M. Lenz, naturalist to the expedition of Kotzebue, made a series of well-conducted experiments on the temperature and saltness of the ocean in different latitudes and at various depths. The instrument he employed for ascertaining the temperatures was an improvement upon that of Hales, being a large cylinder closed at both ends by valves opening inwards, to one of which was attached a thermometer, and surrounded by a highly non-conducting substance. The results are contained in the following table:—

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* Nobili, Bib. Univ., Juillet, 1830, p. 275.

	Time of observation.		Places. Lenz.	Lat. N.	Long. W.	Depth in toises.*	Temperature. at surface.	at depths indic.
1	1823.	Oct. 10,	Atlant. Oc.	7°21′	21°59′	539	25°,80 C.	2°,20
2	1824.	May 18,	South Sea.	21 14	196 1	140,7	26,40	16,36
3	—	—	—	—	—	413,0	—	3,18
4	—	—	—	—	—	665,1	—	2,92
5	—	—	—	—	—	914,9	—	2,44
6	1825.	Feb. 8,	—	25 6	155 58	167	21,50	14,00
7	—	Aug. 31,	—	32 6	136 48	89,8	21,45	13,35
8	—	—	—	—	—	214,0	—	6,51
9	—	—	—	—	—	450,2	—	3,75
10	—	—	—	—	—	592,6	—	2,21
11	1826.	Mar. 6,	Atlant. Oc.	32 20	42 30	1014,8	20,86	2,24
12	1825.	Aug. 24,	South Sea.	41 12	141 58	205,0	19,20	5,16
13	—	—	—	—	—	512,1	—	2,14
14	1826.	Mar. 24,	Atlant. Oc.	45 53	15 17	197,7	14,64	10,36
15	—	—	—	—	—	396,4	—	9,95

From this table the following conclusions may be drawn :—

1. Between the equator and 45° the temperature of the ocean decreases regularly to the depth of a thousand fathoms, beyond this no other experiments have been made.

2. The decrease of temperature is at first rapid, it gradually decreases, and becomes at last insensible.

3. The point where the decrease becomes insensible appears to rise with the latitude. At 41° and 31° it is between 200 and 300 fathoms, at 21° it is near 400. To this remark there appears to be a slight exception at 45°.53, when the temperature at 400 fathoms is still at 10° C., but perhaps that observation is modified by the proximity of the land, since it was made in the Atlantic Ocean only 15° W. from Greenwich, and consequently near the coast of Europe, while the others were made in the south sea far from any continent; but even in this case the point where the decrease of temperature becomes insensible is still evidently near 200 fathoms.

4. The lowest temperature observed is 2.2 C. (36° F.) and it is perhaps that of all the depths at which the decrease is insensible. The locality of that temperature rises with the latitude; and it would be interesting to know at what latitude it reaches the surface.

The results of M. Lenz, in regard to the saltness of the sea, have been deduced from its specific gravity. It had previously been shown by M. Erman that salt water having a specific gravity of 1.027, the mean of that of the sea, diminishes in bulk gradually down to 25° F., and does not reach its maximum density before congelation. M. Erman's experiments on this contraction extended from 59° F. to 25°, M. Lenz extended them up to 86°, and thence deduced a law for reducing the specific gravity at any one temperature to what it would be at any other. The following table exhibits the specific gravity corrected to the temperature of 63°.5 F., distilled water at that temperature being reckoned unity :—

* A toise = 1,066 English fathoms.

No.	Lat. N.	Long. E.	Depth in toises.	Specific Gravity. at surface.	beneath.	Difference.
1	7° 20′	21° 59′	539,0	1,02574	1,02645	—0,00070
2	21 14	196 1	665,1	1,02701	1,02666	+0,00035
—	—	—	929,4	—	1,02659	+0,00042
3	25 6	156 58	167,0	1,02706	1,02674	+0,00032
4	41 12	141 58	205,0	1,02562	1,02609	—0,00047
—	—	—	512,1	—	1,02658	—0,00096
5	32 6	136 48	214,0	1,02678	1,02624	+0,00054
—	—	—	450,2	—	1,02651	+0,00027
—	—	—	592,6	—	1,02629	+0,00049
6	32 20	42 30	1014,7	1,02825	1,02714	+0,00111
7	45 53	15 17	396,4	1,02738	1,02732	+0,00006

We may conclude, that, *from the equator to* 45° *N. lat. the water of the sea, to the depth of* 1000 *fathoms, possesses the same degree of saltness.* M. Lenz gives also two tables exhibiting the results of 258 observations made on the saltness of the sea at the surface, 105 of them made in the Atlantic Ocean, between 56°.41 S., and 50.25 N. lat., and 153 in the South Sea and Indian Ocean, between 57°.27′ S. and 56°.22′ N. lat. From these tables he deduces the following results :—

1. The Atlantic Ocean is salter than the South Sea ; and the Indian Ocean, being the transition from the one to the other, is salter towards the Atlantic on the west than towards the South Sea on the east.

2. In each of these great oceans there exists a maximum of saltness towards the north, and another towards the south,—the first is farther from the equator than the second. The minimum between these two points is a few degrees south of the equator in the Atlantic Ocean, and probably also in the South Sea, though Mr. Lenz's observations do not extend to latitudes sufficiently low in the South Sea.

3. In the Atlantic Ocean the western portion is more salt than the eastern ; in the South Sea the saltness does not appear to differ with the longitude.

4. The greatest specific gravity is found in the Atlantic at the maximum point above alluded to, at 40° W. long. = 1.02856.
In the South Sea at 11.9° = 1.028084.

This last is the only one in the South Sea giving a specific gravity reaching 1.028.

5. In going north from the northern maximum, and south from the southern maximum, the specific gravity diminishes constantly as the latitude increases.—*Brewster's Journal*, April, 1832, p. 141.

Origin of Mineral Springs. By M. Stifft.—I do not consider volcanic rocks and mineral waters as standing to one another in the relation of cause and effect ; but as the products of one and the same cause, of the great volcanic focus existing in the interior of the globe. So long as the gaseous exhalations of this focus are retained by the great mass of superincumbent rock, the intensity of their pressure must gradually increase, till at last they force themselves out by the

elevation and tearing of the strata, and the eruption of gas. Hence the different lavas and volcanic rocks. But should a free exit be permitted to these gases through fissures and canals already existing, volcanic eruptions could no longer take place, while these products would find a continued and peaceful issue in the form of mineral springs; the meteoric waters which sink downwards through different fissures serving as their conductors to the surface of the earth.

What powers have operated and still maintain the activity of this focus will for ever remain beyond the bounds of our knowledge. Supposing, moreover, this focus to exist, and that volcanoes and mineral springs are its outward manifestations, men's opinions will still remain divided regarding their mode of production. Some will consider mineral springs, and also volcanic eruptions, as the direct products of this focus. Others will limit its agency to the determining of certain chemical processes, and consider mineral waters as derived from the lixiviation of the rocks which they have met in their subterranean passages.

I believe that I have been the first publicly to maintain the former of these opinions. I have been induced to adopt it on the following grounds:

1. The very general distribution of mineral springs over the earth's surface, and their emergence from every rock formation, without regard to its relative age or composition. Mineral springs of exactly the same character are seen to issue both from the oldest granite and the newest tertiary formations, in the same way that volcanic products traverse the whole series of formation.

2. The uniformity and permanency in their constitution and temperature, and in all their leading characters; a similar uniformity is equally characteristic of the volcanic products of a district.

3. The gaseous exhalations which accompany both mineral springs and volcanoes.

4. The occurrence of most of the ingredients of mineral springs as sublimates in volcanoes.

5. The inconsiderable effects of very extensive and destructive earthquakes in those districts where mineral springs emerge from the bowels of the earth.

6. The evident influence of violent earthquakes upon mineral springs at immense distances from the seat of convulsion. This fact is in my opinion of great importance, as it seems to demonstrate that the focus of mineral waters is at a great depth, and cannot be deduced from any local cause.

7. The known fact, that very often volcanic eruptions are accompanied by the bursting out of new thermal springs, which sometimes cease when the volcanic agency becomes feeble, sometimes return periodically like the eruptions themselves.

Besides this, from all those districts which bear the traces of former volcanic activity, there also issue mineral springs which present in a greater or less degree those characters which distinguish volcanic

products. Sulphureous springs, for instance, appear in those districts where sulphureous sublimations are a product of volcanic activity. Przystanowski considers beds of sulphur as the cause of volcanoes; to me they seem to be merely the sublimations consequent upon their activity. If only gas rose from the orifices of our sulphureous springs, we would see the formation of similar sulphur beds. In this way I explain the existence of native sulphur which is found at Ems between the greywacke strata from which the thermal waters issue, but in situations where no springs exist. It does not follow from these principles that we are to exclude the action of atmospheric causes. On the contrary, I am of opinion, that by far the greater quantity of the water of hot springs, and all that of cold springs, is derived from the atmosphere, which is conducted by well known modes into the interior of the earth, and unites partly with the water of the matters which go to prove the central focus, partly without reaching as far as the focus, merely takes up the exhalations and sublimations it finds in its progress, and reissues at the surface according to the known laws of hydrostatics, aided no doubt in some measure by the pressure of the ascending gases.—*Jameson's Journal*, April, 1832, p. 291.

ANATOMY AND PHYSIOLOGY.

On the Developement of Embryos.—At the meeting of the Academy of Sciences of Paris, on the 19th December, 1831, M. Flourens read, in his own name and that of M. M. Geoffroy St. Hilaire, Serres, and Ampere, a report of the Committee on the researches of M. M. Coste and Delpech on *the Evolution of Embryos*, a short summary of the investigations of these experimenters we are enabled to give.

A fecundated egg being submitted to the action of a certain degree of heat, the *vesicula* is perceived to become at first more dense, and then to be surrounded by concentric circles, or arcs of concentric circles, which Haller terms *halos*. These circles uniting form a kind of opaque disk, termed by Pander the *tapis*, and finally the centre of this disk, or the *vesicula* itself which had hitherto remained transparent, becomes cloudy and opaque. These phenomena are presented in the first twenty hours of incubation; and it is after this period that the observations of M. M. Delpech and Coste, on the appearance of the first rudiments of the nervous system, commence.

The clouds which penetrate the *vesicula* are at first confusedly distributed, but they are gradually perceived to assume a regular arrangement. They group themselves on each side in curves, which present their concavity to the axis of the vesicula, and their convexity to the circumference. These curves are, according to the

authors, the first rudiments of the nervous system. In fact they have demonstrated that very soon these curves straighten, and reunite into two masses or cords, which lie parallel to the longer axis of the elliptical cicatricula. These two cords are the rudiments of the cerebro-spinal system. When first formed there exists between them an interval which gradually diminishes, and the cords approximating, touch and reunite all along by their middle portion. Then turning forward they form an anterior suture and a first canal, and finally recurving in a similar manner towards their posterior surface, their borders unite there also, and thus is formed the posterior suture and the second or posterior canal. These facts, with the exception of the formation of the posterior canal, had been proved by the experiments of the Committee, who, however, though not having verified it, yet do not impugn the accuracy of the opinion of the authors.

In a subsequent memoir, read in the Academy on the 2nd January, 1832, M. M. Delpech and Coste endeavoured to account for the formation of embryos molecule by molecule, according to the laws of electro-dynamic currents, as deduced by Ampere. One of the most interesting of the results to which they have arrived, and which has been verified by the Committee of the Academy, and by a number of distinguished foreign philosophers, is, that the two parallel cords, which, as was before mentioned, constitute the rudimental cerebro-spinal axis, having been formed, two currents traced by the columns of blood that they bring with them, set out from the central point of the axis, and proceed one to the head and the other to the tail. In the present memoir, an egg is described, in the yolk of which two germs have been completely formed, but the axes of the two nervous systems are not parallel either to each other, or to the line representing the axis of the yolk. Further, the *tapis* of one is found crossing and superimposed on that of the other. The authors have attempted to prove that one of the germs has approximated to the other by moving parallel to the common plane, so as to glide between the superficial surface of the other, and the deep surface of the vitellary sac. This motion supposes a force, which the authors find in the electric currents mutually developed by the two germs.

In fact, the nervous apparatus in one and in the other was so arranged, that the two heads and the two tails were in the same direction, consequently the currents being parallel they should mutually attract. If the germs had been placed in a contrary position, (the head of one corresponding to the tail of the other,) the currents would have been in opposite directions, and mutual repulsion would have been produced. This ingenious explanation of the union which tends constantly to take place between the two heads or the two tails of embryos, applies beautifully to the known examples of monsters; M. Geoffrey St. Hilaire and his son, having proved not only that we have no example of two embryos, with the upper extremities of one united to the lower extremities of the other, but that it is even impossible that such could be the case. M. M. Delpech and Coste have not only given the physical cause of this impossibility, but can

by this fact corroborate their proofs of the other portions of their researches.—*Archives Gen. de Medicine. Fevrier, Mars*, 1832.

Formation of the Sub-occipital Ganglion.—The older anatomists were contented with naming the ganglion, when speaking of the sub-occipital nerves, without determining to which of the two roots it belonged. Soëmmering, Cloquet, and Meckel, more precise in their observations, stated that the ganglion always occurs at the junction of the two roots. From careful dissections of the nerve on more than 80 bodies, Dr. Vittorini has clearly proved that the Ganglion is constantly found on the posterior root, three or four lines from its point of union with the anterior root. He has never seen the posterior root absent, and the nerve formed totally by the anterior root, as was stated by Morgagin, Gordon, and Vicq. D'Azyr; the only anomaly that he, on one occasion, met with, was, with regard to the course of the fibres of the posterior root, which were divided into two bunbles, one of which was anterior, and the other posterior to the nervus accessorius, which could be seen enclosed and bound down between the fasciculi. The fibres of the anterior one united entirely to the accessory nerve, and formed a very small ganglion; those of the posterior bundle united partly to that ganglion, and partly passed in all directions round this ganglion, reuniting with the fibres of the anterior bundle, and with some of those of the posterior, which had concurred in the formation af the ganglion. By this union the remainder of the posterior root was formed, which from that out proceeded regularly in its course.—*Bulletin des Sciences Medicales, September*, 1831, p. 216.

History of a young Girl destitute of Cerebellum.—Alexandrine Labrosse, born at Versailles, in May, 1820, of a strong and robust father, but her mother was weak and unhealthy, being broken down by excesses. This child was, when born, small, but well made. She was extremely delicate, and grew slowly. At the age of two years she had not yet got her teeth, and at three she could only stammer a few scarcely articulate words. M. Miquel saw her in 1827, he learned from the father that she could not stand upright until she was five years old. He was struck by her stinted developement, and particularly the weakness of her extremities. This symptom, united to the want of intelligence in the child, and the incapability of distinct articulation, made him suspect some injury of the brain. The last time he saw her, (she was then nine years old,) her pupils were very much dilated, and her nurse told him that she continually kept her hands down on the organs of generation.

In January, 1830, she was taken into the Hospice des Orphelins. She was then weak, intelligence very trivial, when she was spoken to she answered with difficulty and hesitation. Her legs were very feeble, but she enjoyed the use of all her senses in an eminent degree. She remained always in a very dejected state; never speaking;

alluding neither to pleasure nor pain; when spoken to, she answered monosyllabically *yes* or *no*, but always correctly.

In the middle of February she was attacked with enterite and stomatite, and died the 25th March, 1831.

After her death, M. Combette, who reported the case to the Academy of Sciences, learned on the most unquestionable authority, that she was intensely addicted to masturbation, and occasionally to epileptiform convulsions.

On dissection, the lungs were found sprinkled with miliary tubercles, there were numerous ulcerations in the intestines.

Under the integuments of the skull, near the right parietal prominence, there existed a large ecchymosis. The skull was thicker than ordinary. The meninges did not present any thing particular. The brain appeared healthy, but large; when more accurately examined by M. Magendie, he found in the left posterior lobe a small clot of blood, apparently recent, and about two or three lines in diameter. The tentorium cerebelli having been cut, the spinal marrow severed at the occipital foramen, and the encephalic mass removed and turned up, the following appearances were observed.

A great quantity of serous fluid ran out, and filled up the occipital fossæ. We found in the situation of the cerebellum, a gelatiniform membrane, of a semicircular shape, attached to the medulla oblongata, by two membranous and gelatinous peduncles. Near these peduncles we found two small masses of white substance isolated, and as if detached, of the size of peas. On one of them existed one of the fourth pair of nerves. The optic tubercles were uninjured. Behind and below we remarked a kind of erosion, in which the orifice of the canal of Sylvius was visible. It extended a little on the medulla, and altered slightly the restiform bodies, but scarcely the olivary bodies. There was no fourth ventricle. There was no trace of pons Varolii; but there did not appear to have been any destruction of substance. The anterior pyramids terminated anteriorly, in the peduncles of the cerebrum.

Of the cerebral nerves we could only distinguish the origins of the first, second, third, and fourth pairs, which were normally circumstanced, except the last, which was detached with the small white body of which we have before spoken.

The origin of the other pairs could not be found. They, however, existed, and could be traced to the orifices in the dura mater. They were carefully dissected by M. Magendie, but presented no peculiarity.

The cerebral substance was of the usual consistence, but that of the medulla appeared softened, particularly at the erosion before mentioned, where it looked as if it had been macerated. The occipital fossæ were regularly formed, perhaps a little small. The vertebral arteries existed, but were not carefully dissected.

Genital Organ.—The finger could be easily introduced into the vagina; there was no hymen. The labia majora were bright red, and appeared to have been frequently irritated. The uterus and ovaries

did not appear larger than is usual in young girls at that age.—*Bulletin des Sciences Medicales, October*, 1831, *page* 1.

PATHOLOGY AND THERAPEUTICS.

On the real Nature of Gelatiniform Ramolissement of the Stomach, (*Gastro-Malacia*,) *by* Charles Winter.—The very extended memoir of M. Winter is divided into six chapters, in which the author successively investigates the nature, causes, diagnosis, prognosis, treatment, and prophylaxis of this disease. We shall endeavour to communicate concisely the results to which he has arrived.

From the investigations of other writers, as well as from his own researches, M. Winter defines gastro-malacia to be an affection of the venous and capillary systems, manifesting itself as an inflammation of the gastric mucous membrane, having for its cause a state of congestion, and for its result the softening and destruction of the mucous membrane. The icterus and erysipelas of newly born infants, induration of the cellular tissue, apthæ and gelatiniform ramollisement of the stomach, are affections, according to him, of the same nature, often arising from the same cause, and existing in the same individual. The cause he supposes to be a pathologic state of the venous and capillary systems, but he thinks that the veins alone are primitively engaged, and that the affection is but secondarily transmitted to the capillaries.

Setting out from this theoretic point of view, the author, in the remainder of his memoir, endeavours to prove, that the congestion depends upon an excess of venous blood, upon a *predominant venosity*, and that this disposition is sometimes hereditary and sometimes acquired: that moreover this predominance of the venous system may vary at different ages in consequence of the variable influence of external agents. When the mother is placed under those circumstances, so well known, which are capable of deranging hematosis and disturbing the chylification, we often see children with an exalted venosity, who a few days after birth fall victims to this innate disposition. This hereditary venosity is consequently much more abundant in the poorer classes. Other circumstances also produce the developement of this constitutional disease, either at the moment of birth or during after life, among which are most of the agents which tend to prevent the proper formation of arterial blood.

The stomach is abundantly provided with arteries and veins in its lesser curvature, but in its greater curvature the veins are in larger proportion than the arteries; by these veins the stomach is put in direct communication with the liver and spleen, and every ingestion of food brings on a copious afflux of venous blood from these organs; consequently the stomach is subject to frequent venous congestions,

which bring on these derangements that terminate in softening. When these congestions are repeated, the functions of the viscus become more and more disturbed, and the stomach relieves itself by a secretion of mucus; but this stage is soon passed, and inflammation sets in. This kind of inflammation generally terminates in softening, seldom in ulceration, from the peculiar disposition of the mass of humours.

The most characteristic symptoms of this disease are, according to M. Winter; 1. Copious diarrhœa of a serous green matter resembling chopped spinage. 2. Vomiting of a consistent mucoso-bilious matter; these vomitings require but little exertion on the part of the patient; they are very intractable, and often continue from the beginning to the end of the disease in spite of all remedies. 3. Intense and unextinguishable thirst. 4. Fever, at first sensible only in the evening, then more permanent and increasing in intensity as the disease grows more violent: it is occasionally, however, entirely absent. 5. Sudden loss of strength from the very commencement, gradually increasing, and accompanied by rapid emaciation. 6. Paleness and cold of the extremities. 7. Peculiar tendency to somnolence, easily shaken off. 8. Frequent cough. 9. Continual agitation; this is one of the most constant symptoms. 10. Acute cries, face expressive of deep pain and suffering. 11. Convulsions. Of all these symptoms, however, M. Winter considers the most important and constant to be, the sudden prostration of strength, the rapid emaciation, the paleness and coldness of the extremities.

The prognosis is generally fatal. The treatment proposed by our author is as follows. If the disease be acute he commences by applying leeches or cupping glasses to the epigastrium, then he makes the patient take several warm baths in the day, and after each bath rolls him up in flannel cloths. If these means do not stop the malady, he applies sinapisms to the abdomen, or uses mustard pediluvia. If the warm baths cannot be gotten, the whole body is rubbed well every two hours with heated flannel cloths. If the bowels are constipated, he gives occasional lavements of warm water with a little oil and salt; internally he gives cherry water, (aqua cerasorum nigrorum,) which contains an exceedingly small quantity of prussic acid, with extract of henbane.

As soon as the vomiting and diarrhœa have ceased, he considers that bitter resolutives with neutral salts are indicated, and gives the extract of taraxacum, of chelidonium, or of rhubarb, infusion of rhubarb, nitrate of soda, soluble tartar, or subcarbonate of potash, in solution in an aromatic water, according to circumstances.

For drink throughout the disease, whether in its acute or chronic form, he recommends the acidulated mineral waters, as the Seltzer; and for diet, the different vegetable mucilages, as arrow root, &c.—*Rust's Magazin, für die Gesammte Heilkunde,* Tom. xxiii. p. 232.

Cure of Chronic Hydrocephalus by Puncture.—A boy who from his birth had had his head largely developed, but was otherwise

well, was brought to the clinical hospital of Berlin. He was aged four months, pale but not emaciated. The head had the peculiar stamp of chronic hydrocephalus, the face was small in comparison to the skull; the hair was scanty, fair, and delicate; the fontanelles largely open; the sutures gaping; the bones of the skull moveable, thin, but slightly ossified. In its greatest circumference the skull was 18¼ inches,* (German): fluctuation was every where evident, particularly over the anterior and posterior fontanelles; and when one of the fontanelles was pressed on, a hard and translucent tumour was produced at the other. All other curative means being ineffectual, M. Græfe resolved to puncture. He compressed the greater fontanelle, so as to render the lesser tense, and then plunged a pretty large cataract needle at first vertically into the fontanelle, near the osseous border, and then turned it obliqely for half an inch. The viscid liquor issuing only drop by drop, the operator withdrew the needle and introduced a very fine curved trocar; as soon as the canula was opened a strong jet of a yellowish brown transparent liquor came away. After half a minute the canula was closed, and re-opened at the end of a few minutes; this was repeated several times, and the skull gently compressed with the hands applied on the sides. When ʒxii of liquor had been abstracted, the eyes of the child suddenly became dull, the pupil small, the face altered, and the pulse weak: the canula was then withdrawn, the wound closed, and the head compressed by bandages. These unpleasant symptoms were removed after some hours by stimulants, but the child remained restless or disturbed for a few nights. The same train of symptoms supervened after each of the subsequent punctures, which were not undertaken until the child had been perfectly restored, (at intervals of from 10 to 14 days.) After each puncture the diameter of the head diminished by two or three lines. By degrees the dimensions of the skull became proportioned to those of the face and the body in general; the fluctuation and the mobility of the bones of the head diminished; the sutures closed, and the general health became much improved. The punction had been repeated eleven times in the year 1829, viz. the 8th, 15th, and 23rd of January, 19th of February, 15th and 29th of March, 19th and 27th of April, 5th and 27th of May, and 23rd of June. After the last puncture the fluctuation was no longer evident, the small fontanelle and all the sutures were closed, the larger fontanelle alone remained slightly open. After the ninth puncture it began to articulate some words and walk, and at the age of ten months could walk and articulate distinctly. At the end of June, the head, measured at its greatest circumference, gave 18¾ inches. The 26th November, 1830, the child, aged 2½ years, was shown to the Society of Medicine of Berlin. —*Graefe's and Walther's Journal fur Chirurgie und. Augen Heilkunde*, 1831. B. 15. p. 3.

* There must be a mistake here in the memoir. See the measurement afterwards given as the circumference of the head after the recovery of the child.

R. J. K.

Treatment of Colica Pictonium.—M. Gendrin communicated to the Royal Academy of Sciences observations on the employment of alum in the treatment of saturnine colic. Recommended long since by Grahuis, Adair, and Michaelis, it has been used with great success by M. Kapeler in the Hospital St. Antoine, and of fifty-eight cases treated with it by M. Gendrin, many of which had resisted various other means of cure, it did not fail in a single case. This great success induced him to exhibit this substance as a preservative, but he has not as yet met with painters willing to use it constantly. M. G. considering that the alum owed its properties to the sulphuric acid that it contained, substituted for it lemonade, made with sulphuric acid, and found that this mode was still more effectual than the use of alum itself: he has treated twelve very bad and four milder cases in this way, the four last were cured in twelve hours each. M. G. proposes sulphuric lemonade as a drink for painters at once refreshing and prophylactic.—*Achives de Medicine, Fevrier* 1832. p. 289.

Researches on Softening of the Spleen, (*Spleno-Malacia,*) by Dr. Hachmann of Hamburg.—Softening of the spleen is sometimes sporadic, but more frequently endemic or epidemic: in the latter case it is intimately connected with those diseases which at the time are endemic or epidemic. Spleno-malacia is frequent not only in man but in animals, particularly the ruminating class. If it is sporadic it accompanies sporadic intermittent fevers: if it is epidemic, it is met with in hot and marshy climates, in consequence of an epidemic remittent or intermittent fever. In the last epidemic in the north of Germany, softening and hypertrophy of the spleen was so constant a phenomenon, that the disease was termed by Dr. Dohru (Splenitis Epidemica Contagiosa.) The fevers of Sardinia frequently terminate in softening of the spleen; but this alteration is always accompanied by lesions of other important organs.

According to Dr. Hachmann's idea, spleno-malacia depends on a congestion or venous inflammation, in which two stages may be observed, the first that of irritation or congestion, the second of softening.

The characters of the first stage are the following; at first fever, in which the gastric symptoms predominate, and varying in type according to the season, the climate, and the prevalent medical constitution. In hot and marshy countries, and in these countries during the summer, the paroxysms approximate so closely as to leave scarcely a trace of remittence, and the fever becomes continued. As soon as the paroxysm commences the patient vomits a clear liquor slightly mingled with bile; this vomiting is repeated during the cold stage, ceases at its termination, and recurs with each new paroxysm. Vomiting of blood has not been observed but in chronic cases. Another essential symptom of spleno-malaxy is precordial anxiety, which has the same exacerbations and the same remittences as the fever, and which probably arises from the pressure of the tumefied spleen against the diaphragm. This symptom is never totally absent, and is so intense

as to produce orthopnea. The other symptoms are great lassitude, sharp pains in the limbs, vertigo, redness of the face and conjunctiva, ardent thirst, and augmentation of the precordial uneasiness on drinking. The tongue is at first pale and covered with a yellowish white furr; it afterwards becomes lively red, cracks, or remains moist and covered with apthæ. The abdomen is meteorized, but not sensible except at the epigastrium. There is generally diarrhœa, (15 to 20 stools in 24 hours;) the fœcal matters blackish green, watery, and very fœtid. Restlessness, agitation, slight delirium. The pulse variable, full, soft, occasionally small, hard, and rapid, sometimes intermittent.

The passage of the disease to the stage of softening is announced by great collapse, and the appearance of typhoid symptoms: death follows after the supervention of an apoplectic or comatose state.

The progress of spleno-malacy is generally acute, like that of the severe fevers of which it is but one phenomenon, as at the end of 10 or 12 days: but it may also occasionally assume a chronic form. There are different degrees of softening; in the first the spleen is gorged with black or brown blood, in the midst of which the proper tissue of the organ is no longer distinguishable. It is more friable, and by pressure may be deprived of a great part of its blood. In the highest degree of softening the spleen bursts spontaneously, even during the life of the individual, the contained matters are then effused into the cavity of the abdomen, and death is rapidly produced by hemorrhage. Although generally, yet the volume of the spleen is not always increased when it is softened.

Dr. Hachmann is rather inclined to consider the disorganization of the spleen to be the consequence of repeated paroxysms of the intermittent or remittent fever than the cause of those diseases. He thinks that the repeated congestions of so vascular an organ, during the cold stages, produce a sort of congestive or venous inflammation which is the first grade of the pathologic condition to which he has directed the attention of physicians.—*Litteratische Annalen des Gesammte Heilkunde, October*, 1830, p. 129.

Anatomical Pathology of Cholera.—From a great number of dissections made at La Charité, M. Rayer has concluded, that,

1st. The blood of cholera patients, altered in its properties, is often deposited under the form of petechiæ or ecchymoses in the intestines, and sometimes under the peritoneum, pleura, pericardium, or arachnoid, in the tissue of the uterus, &c.

2nd. That in cholera patients, during the *algid* period, the anormal condition of the organs, which is the most constant and the most striking, is an excessive congestion of the abdominal veins of the superior cava, and of the jugular, the cerebral, and spinal veins.

3rd. That the gastro-intestinal mucous membranes present always more or less, in a variable extent, either in the stomach or in the large or small intestine, one or more of the following pathologic states.

a. Elevation of the follicles in the stomach, small intestine, or large intestine, (in three-fourths of the cases, particularly at the end of the ileum.)

b. Hyperemia by vascular arborization (in two-thirds of the cases.)

c. Sanguineous coloration, punctuated or petechial; ecchymoses, (very common in the small intestine.)

d. White velvety state of the papillæ (in one-third of the cases.)

e. Punctuated vascularity (rare in the intestine, more frequent in the stomach.)

4th. That in the individuals who die *after reaction having set in*, the venous congestion, as well abdominal as thoracic, is always much less pronounced and some times null. Traces of gastritis, colitis, of inflammation of the lungs, and pleura, and sometimes of the peritoneum, and effusions of serum in the brain and spinal column, with or without hyperemia, are then generally met with.

5th. That the most constant and the most persistent *intestinal* lesion in cholera is the developement of the follicles, met with as well in the algide period as in the period of reaction.

M. Rayer divides the course of the disease into three periods, the *gastro-intestinal*, (characterized by purging); the *algide*, (by symptoms of asphyxia); and of *reaction*, (fever). He has not yet determined the connexion of different pathologic appearances with the different stages.—*Archives Gen. de Medicine, Avril*, 1832.

SURGERY.

Fungous tumours of the Dura Mater, and of the Bones of the Skull, by M. Chelius, *of Heidelberg.*—In a Memoir presented to the Academy of Sciences, the 14th February, 1832, M. Chelius lays down, that the fungous tumours of the dura mater and those of the bones of the cranium are not the same disease, they differ in their seat and in their nature. He cites several cases to support his opinion: 1st, A soldier aged 36 years, was attacked by slight pain in the arm, at the insertion of the deltoid. This pain gradually increasing, became at length intolerable, and yet the form of the limb was not altered: soon after, the movements of the arm became different, and the pain made him keep it constantly at rest. This state of things lasted six weeks, when by accident, the arm was luxated; the dislocation was reduced, and the shoulder covered by compresses steeped in oxycrate, &c. There then appeared at the tip of the shoulder a swelling which soon extended to the fingers. Some months afterwards, there appeared at the middle of the forehead, a circumscribed tumour of the size of a pea, affected by occasional lancinating pains. When this tumour had grown to the size of a pea, it was found to proceed through an opening in the skull, and to pulsate. From this out the two tumours continued to increase in size, and violent nasal hemorrhages frequently came on, after one of which the patient died, twenty months after the supervention of the first pain in the arm.

The aorta having been previously injected, the temporal, frontal superciliary and nasal arteries were found to be twice as large as they naturally are, and were more tortuous, and had more ramifications, all of which penetrated the tumour. This last was situated on the surface of the dura mater, below it the brain was healthy but depressed; the tumour had no adhesion to the bones of the skull, it was united to the dura mater and to the pericranium by numerous vessels, which, arising from these membranes, penetrated its tissue. It consisted of a pulpy mass, yellowish white, similar to marrow, in which existed a few small scattered vessels, and small, irregular, and dentilated spiculæ; at its centre there was a more consistent steatomatous mass, which contained still less vessels. The frontal bone presented an opening two inches in diameter externally, and four lines more internally, the ethmoid ungues the horizontal portion of the frontal, and the base of the orbital cavity, had been destroyed to the depth of a line and half. The tumour penetrated into the two orbits, completely enveloping the oblique nerves, and extending into the nasal cavity, where the septum had been partly destroyed, and finally arrived to within half an inch of the external opening of the nose. The tumour of the right arm was of the size of a child's head; formed in the same way, of a pulpy substance externally, and a hard steatomatous mass at the centre, with many small cavities filled with serous fluid. The humerus in its upper portion was destroyed; inferiorly where it corresponded to the tumour, it was totally deprived of periosteum, but we could not trace any organic connexion between it and the tumour. M. Chelius thinks, that in this case the disease commenced in the periosteum and dura mater, and that the bones continued free from any injury by the disease, and were destroyed only by the pressure made on them by the tumours. 2nd, A woman who always had been accustomed to labour in the fields, at the age of 50 adopted a sedentary mode of life. At the age of 54 she began to complain of continual somnolence and severe headach; these symptoms increased, and soon after a small tumour appeared on the forehead. This at first was not painful, but gradually enlarging, it produced frequent faintings and constant sneezing; it finally extended over the whole forehead, covered the right eye, and confounded itself with the parotid gland; it was hard in some places, and soft in others, with fluctuation in its centre. The woman finally died, with all the symptoms of compression of the brain. The opening of the body showed that the tumour was situated between the pericranium and bones of the skull. The pericranium was so dense and so adherent to the bone that they could not be separated without laceration. The skull was not perforated, but presented some small openings, scarcely capable of admitting a very fine probe. 3rd, A man aged 30 years, who had been scrofulous in his youth, and often attacked by venereal, had on the middle of his forehead a tumour, which rapidly grew as large as a hen's egg; it was firm, without any trace of pulsation or of osseus perforation around its base. In time the tumour grew until it occupied the left side of the forehead, the root of the nose, and

the orbit from which the eye was expelled. The patient suffered dreadful headaches, became weak, and finally constantly comatose. After death, it was found that the fungous tumour was connected on one side to the dura mater, and on the other to the pericranium ; in some parts the corresponding bones of the skull had undergone sarcomatous degeneration ; so that M. Chelius considers this case to belong to the sarcomatous affections of the bones.—*Archives de Medicine, Mars*, 1832.

Nyctalopy mechanically cured.—A girl 8 years old, of a lymphatic temperament, was attacked by scrofulous ophthalmia, which lasted for a long time. At the end of this obstinate disease, the child was affected by a nyctalopia, which rendered her incapable of supporting the action of a single ray of light, whether natural or artificial ; a triple cloth covered the eyes of the young patient, and enveloped her whole figure. Notwithstanding this protection, if the child was brought out into day light, she immediately applied her hands to her eyes, to defend them from the action of the light penetrating through the cloth ; and if placed in a very dark room, she could with facility distinguish all the objects in it. Cauteries, blisters, *diete*, tonics, opiates, belladonna, &c., were all tried, but did not succeed in diminishing the sensibility of the retina. M. Vassal constructed two cones of pasteboard, two inches and a half in length, and painted black internally; he fitted to one extremity of each cone a blue glass, and applied the other extremity on each eyelid, so that the borders of the cone penetrated into the entrance of the orbit. A curtain of black taffeta applied to this extremity, prevented the rays of light from arriving at the eye, otherwise than through the cone. From the third day of the use of this apparatus, the child could distinguish objects at the distance of three or four feet. Every eight days M. Vassal diminished the length of each cone, and at the end of three months, the child supported the action of light by means of blue spectacles, which she continued to use for a year.—*Archives de Medicine, Fevrier*, 1832.

Death from an irritating Injection into the Abdomen.—M. Dupuy had for many years treated a girl, aged 27 years, for encysted dropsy of the abdomen : she had been tapped five times. He wished to try the radical cure by inflaming moderately the inner surface of the cyst. For this purpose, after having made a puncture, he adapted a gum elastic tube to the canula of the trocar, and by means of this apparatus, he passed into the cyst the vapour of heated wine. Inflammation set in certainly, but with rather more violence than M. Dupuy had calculated on ; it extended beyond the membrane of the sac, and after thirteen days the girl died of general peritonitis. The autopsie was not allowed, but on puncturing the abdomen, exit was given to a large quantity of yellow fetid matter.—*Journal de la Societé Medicale de Bourdeaux. No.* 33, *September*, 1831.

Numerous Abscesses in the Lungs, Liver, &c. in consequence of Complicated Fracture of the Leg.—A——, aged forty-three years, moderately robust, entered the Hospital Beaujon on the 5th May, 1831. The accident for which he was admitted was fracture of the leg, produced by the limb being caught under a heap of earth that had fallen down. The fracture was reduced, and he was bled. The 6th, the leg was particularly examined: the fracture was oblique: at the inner surface of the leg, at the level of the fracture, there were two small solutions of continuity of the skin, which bled freely, and had been produced by the superior portion of the bone which had protruded. Externally there was considerable swelling, which was attributed to the infiltration of air.

The 11th, the limb was painful; the 14th, purging, the tongue red; the 15th, a greyish sanies, the source of which extended far up in the interosseous space, flowed out abundantly by the wound, which had been formed by the union of the two solutions of continuity before mentioned. Nearly the whole leg is erysipelatous and red. The 16th, the abscess was opened by an incision made externally, and about two inches above the wound, near the anterior border of the tibia. The purging had ceased, the pulse weak, the skin cold.

That evening he had a violent rigor, the tongue became red, and the purging recurred. The 17th, the rigor was less violent, but recurred in the afternoon and at midnight. The pulse was quick, the tongue dry, purging severe, and the skin cold; no alteration of the intellectual faculties, suppuration abundant. The wound became livid, and amputation was proposed. The symptoms remained the same up to the 23d; on the 24th, the physiognomy was profoundly altered, respiration hurried, pulse quick, small, and weak; suppuration ceased. He died in the afternoon.

Autopsy. *Thorax.*—About a quart of purulent brown fluid, containing albuminous flocculi, existed in the cavity of the left pleura; the pleura of the right side adhered throughout to the lung by very old adhesions. At the surface of the inferior lobe of the left lung, there appeared, raising up the pleura, several yellow round plates streaked with red, formed by purulent collections, which penetrated more or less profoundly into the pulmonary tissue. Similar lesions existed in the lower lobe of the right lung. These alterations unequally advanced, constituted here complete abscesses, elsewhere circumscribed pneumonies in the state of grey hepatization; in some points the parenchyma was of a black colour. The heart and pericardium were healthy.

Abdomen. The liver presented on the convex surface of its left lobe prominent yellow plates, surrounded by a slight aureola of injection. When these were cut through, they were found to be real abscesses in some places, in others, to consist of the granules of the liver, yet distinct, infiltrated with pus, and ready to allow of its aggregation into collections of matter. Around these abscesses the

hepatic tissue was of a slate colour. A vein which terminated in one of these abscesses had its parietes thick, yellow, and infiltrated with pus. Similar alterations were met with at the inferior and posterior surfaces of the organ, and scattered through its substance. The spleen was soft, of a black colour. The mucous membrane of the stomach was thick, of a slate colour, and softened in the great cul de sac. The intestines healthy.

Examination of the fractured Limb.—The fibula was broken near its upper end, and the tibia was comminutively fractured below the middle of its length. The popliteal vein, immediately above the fracture, was filled with pus; this liquid was pure inferiorly for the extent of some inches, above, with a sanguino-purulent sanies. The internal surface of the vein was raised up by small purulent collections.—*M. Danvin, These sur quelques Accidens tres communs a la suité des Suppurations Aigues.* Paris, 1831, No. 85.

Furious Delirium, consequent on the Repercussion of Erysipelas, cured by recalling the Inflammation.—A man aged 45 years was wounded the 24th November last in the thigh by a stabbing instrument, which penetrated four inches, and grazed the femoral artery without injuring it. M. Blondin found him in the following state: Face red, pulse 100, head-ach; the edge of the wound red and painful; he was bled and put on low diet. The next day but one his state was very alarming; face red, pulse 130, look wild and stern; complete loss of intellectual faculties, furious delirium, violent movements of the limbs, &c. On interrogating his parents as to what had past, M. B. learned that the thigh, in the situation of the wound, had become of a purple red some hours after his visit, with great heat and pain, and that they had applied on the part compresses dipped in cold water and vinegar; that under the influence of this treatment, the redness, and even the pain, had completely disappeared; and there remained but a slight yellowness in the part, and finally, that the cerebral symptoms came on suddenly afterwards with extreme violence. M. Blondin immediately bled him, applied twelve leeches behind the ears, sinapisms to the feet, a purgative injection, and friction with tartar emetic ointment, to the part which had been the seat of the erysipelas. The fifth day the inflammation returned, and extended over the internal and superior third of the thigh. The cerebral symptoms disappeared, and the patient complained only of head-ach and lassitude. The following days the erysipelas extended, and considerable fever set in; this was combated by frictions with mercurial ointment, and in eight days the patient was completely recovered.—*Archives de Medicine*, Fevrier, 1832.

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